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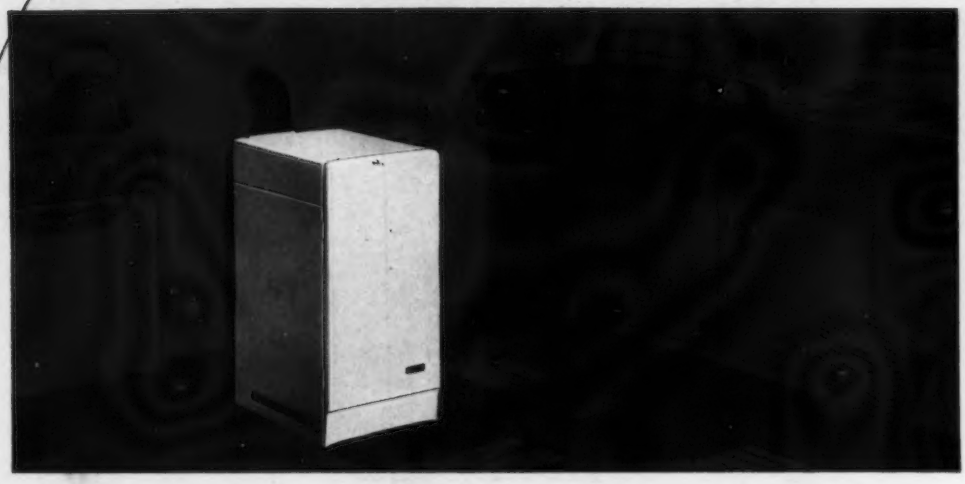
Gas Journal

VOL. 288. 108th YEAR. LONDON, NOVEMBER 7, 1956. Nº 4869. PRICE 1/6

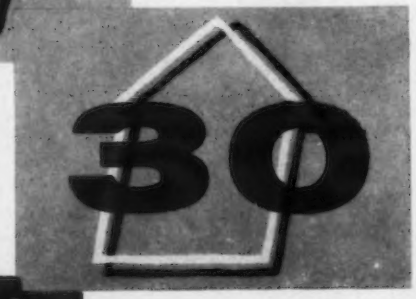


...ust sits in the corner of the kitchen and minds its own business"

Those are the words that an owner recently used when speaking of his 'Diplomat' Gas-Fired Boiler. They are, in fact, quite an accurate description, for the 'Diplomat' is entirely automatic and requires a minimum of maintenance.

The 'Diplomat' is one of the latest additions to the famous 'Potterton' family. It is built to give unfaltering service for years and years—and at the same time it is simply yet attractively designed and sells at a competitive price. Men like it because, once it is installed, they can forget all about it; women like it because, with its choice of colours it fits into any kitchen scheme—and is so easy to clean.

It is at present available in two sizes; other models are being developed. Special 'glass'-lined waterways by a new process can be supplied for soft-water areas. Easy accessibility, foolproof controls and the fact that on first lighting from cold there is virtually no condensation mean that the 'Diplomat' can always be recommended with complete confidence.



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Provided no major factors intervene, the price of De La Rue products will be stabilized until March 31st, 1957.

The 'Diplomat' Gas-Fired Boiler

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Available in white · cream scarlet and viridian green

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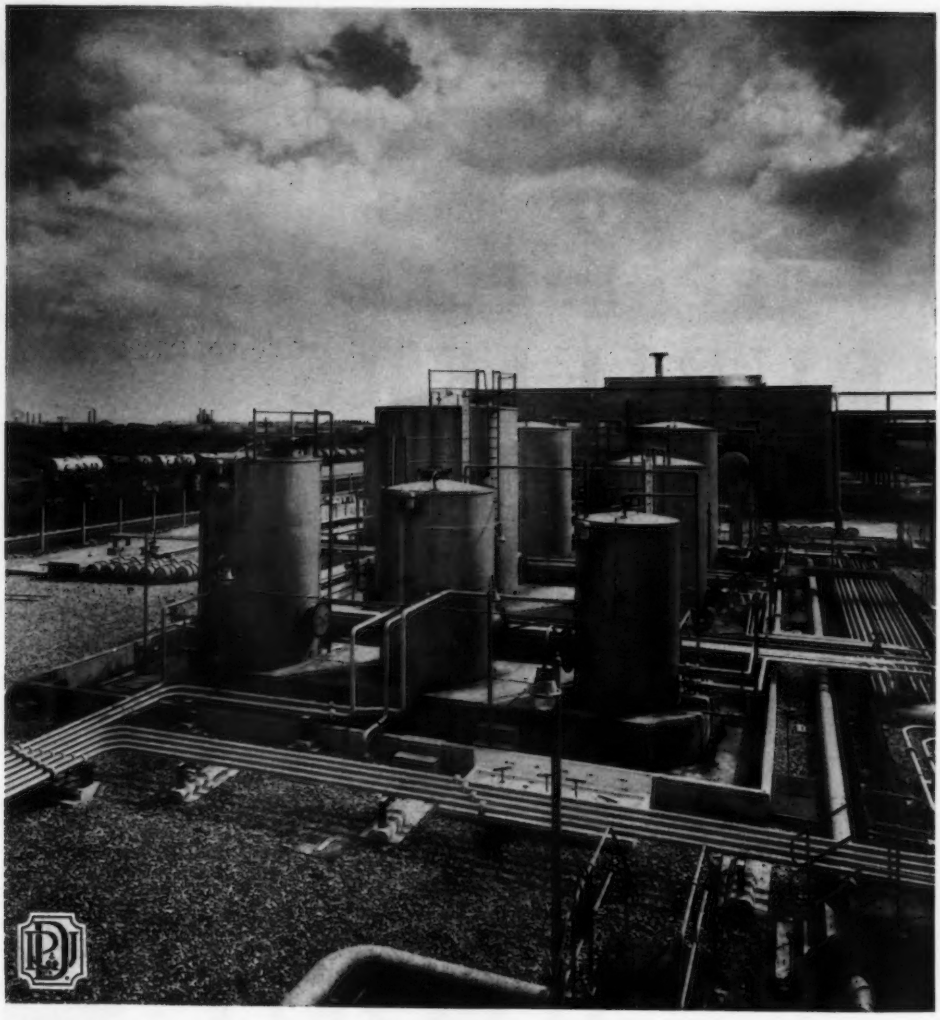

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Miscellaneous welded steel tanks by DEMPSTERS of MANCHESTER
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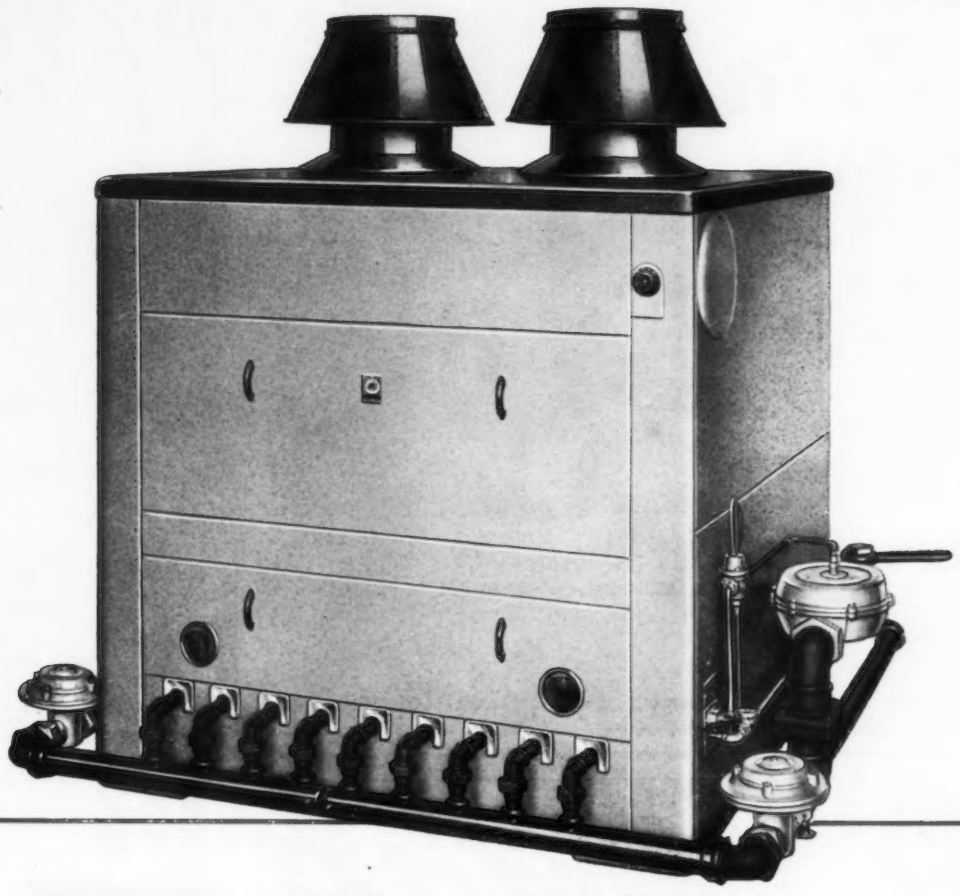

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An outstanding feature of the new Ideal No. 3-GBD Series Gas Boiler, which replaced the No. 3-GBC Series as from September 1st, is its strikingly handsome appearance.

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Those parts of the Jacket which are removable for cleaning purposes are fitted with neat black plastic handles, while the apertures through which the burner pipes enter the Boiler are framed with chromium-plated strips.

The front platework is painted black and is sealed with asbestos rope to ensure a gas-tight fit.

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Please post me a copy of the completely revised edition of the Engineers' Rawlbolt Reference Chart (Publication No. R1144)

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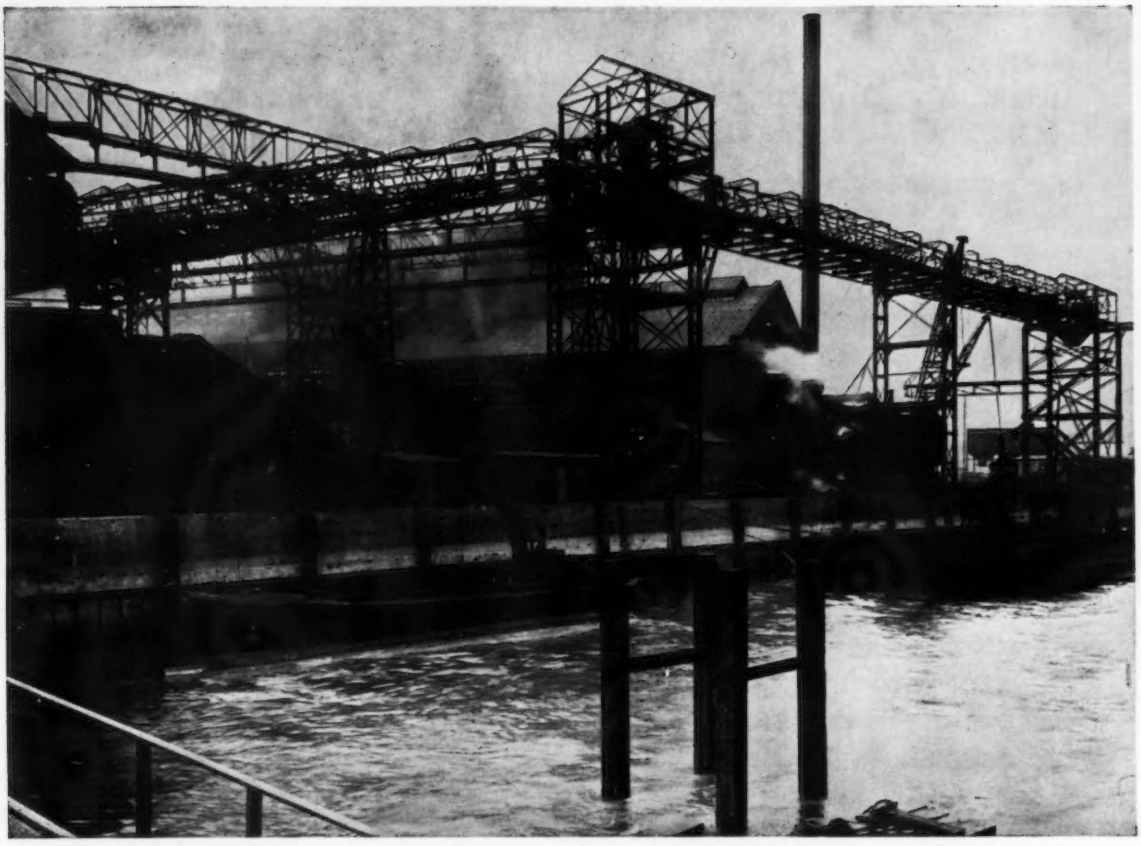

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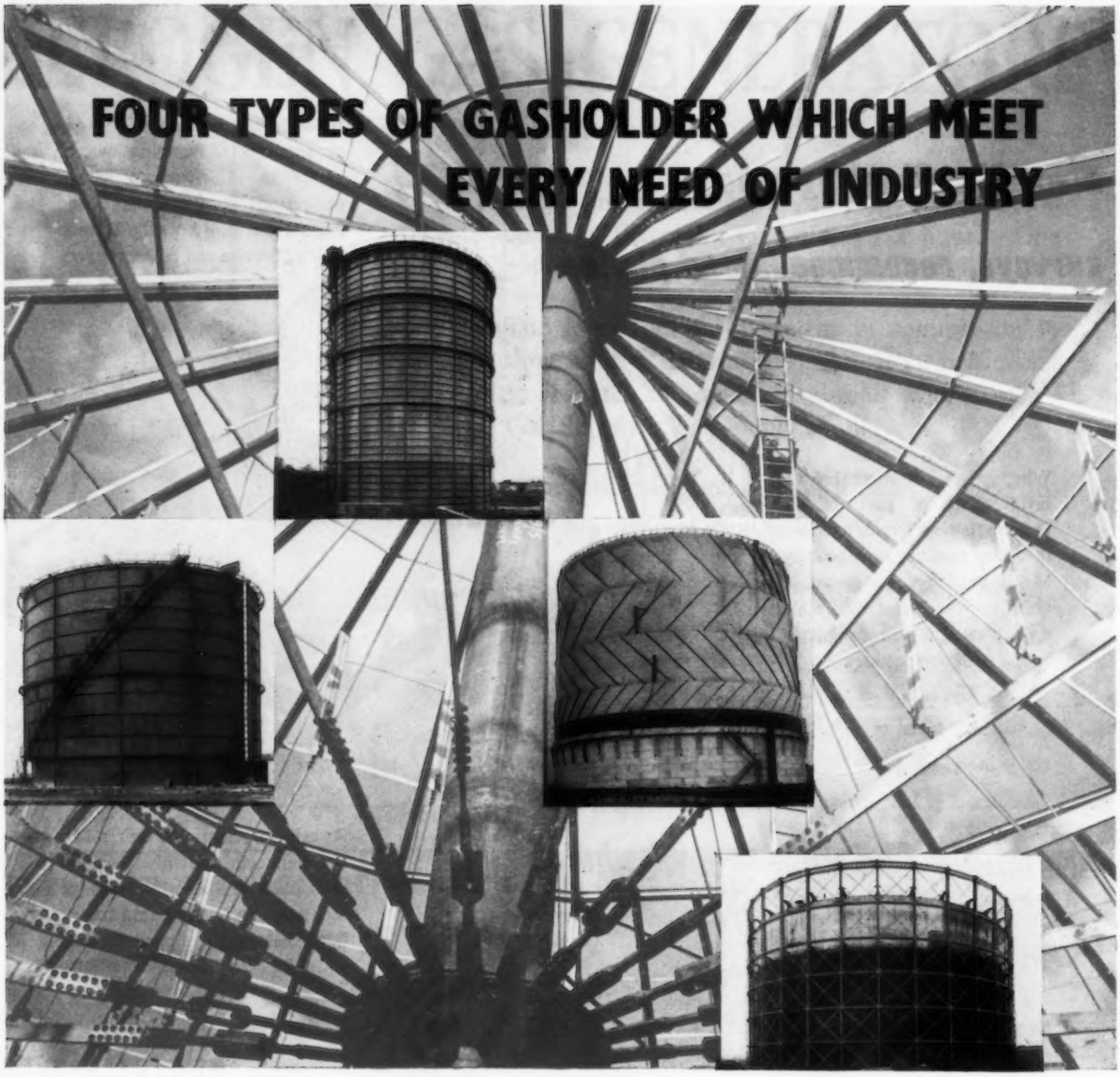

The ABP-KLONNE type of gasholder has a dry seal which eliminates the use of tar and incorporates a self-operating system of lubrication controlled by the piston movement. The WIGGINS gasholder is the only one with an absolutely dry frictionless seal; and it does not use water, tar or grease. Operating costs and maintenance problems are, therefore, virtually non-existent. Water-sealed gasholders—both column and spiral guided—can be designed to contain gas in small and large capacities.

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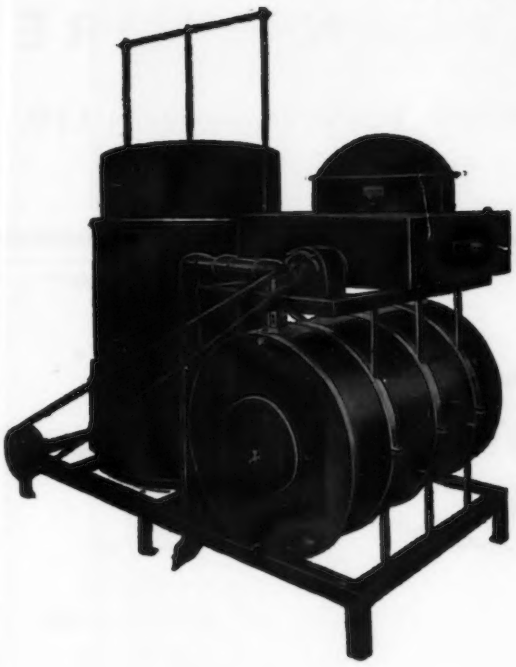

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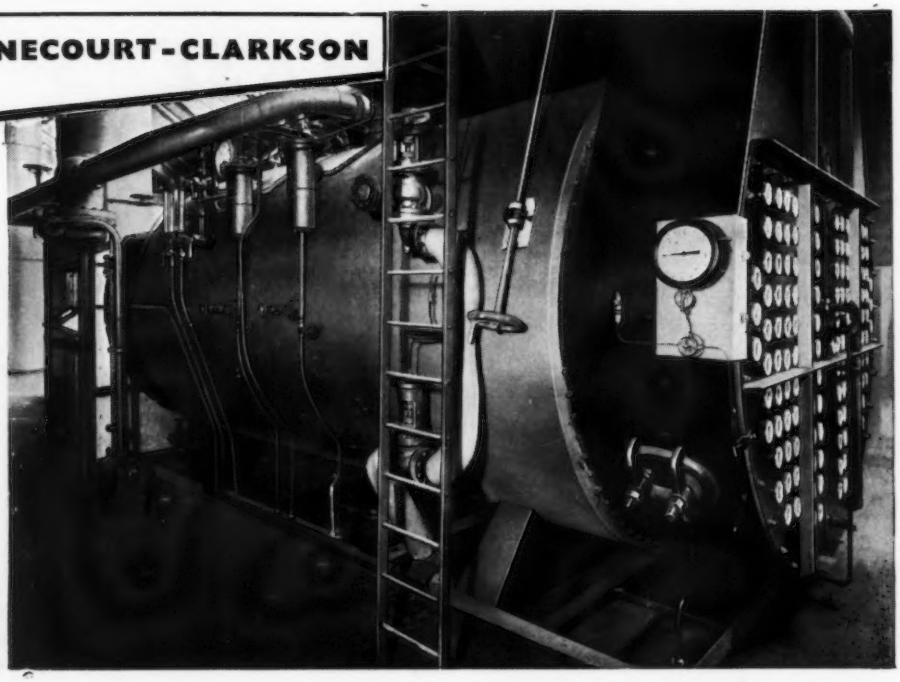

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The illustration shows one of the Spencer-Bonecourt waste-heat boilers at Stoke-on-Trent Gas Works. Similar units are installed on all the Glover-West Continuous Vertical carbonising plant in this works.

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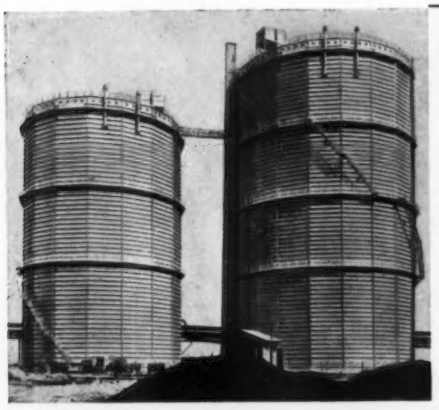

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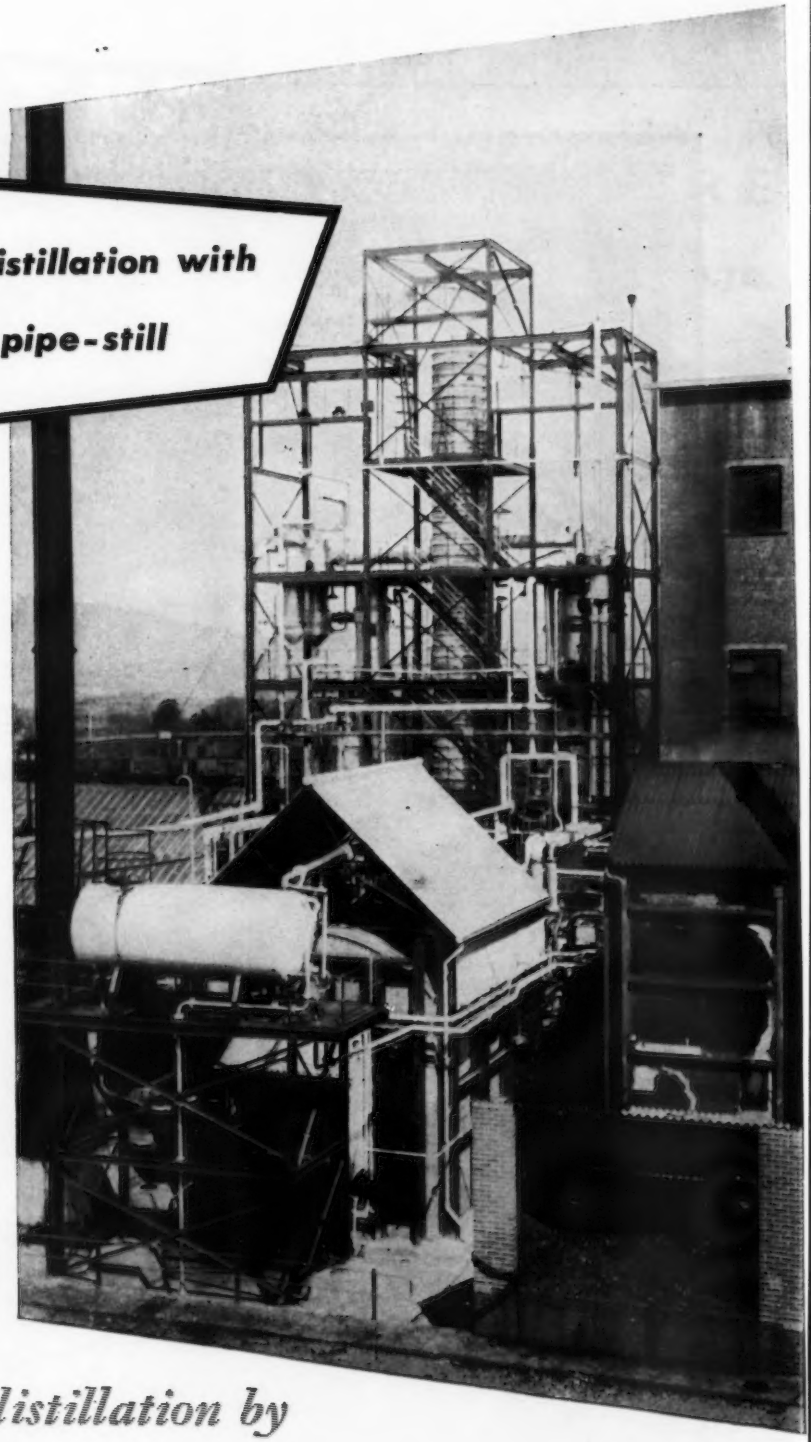
CONTINUOUS tar distillation with the new Wilton pipe-still



This 150 tons per day distillation plant has been designed and constructed by Chemical Engineering Wiltons Ltd at Cærphilly for the South Western Division of the National Coal Board.
The plant uses the well established Wilton system in a pipe-still specially designed to meet the demand of modern works for efficient operation and maintenance.
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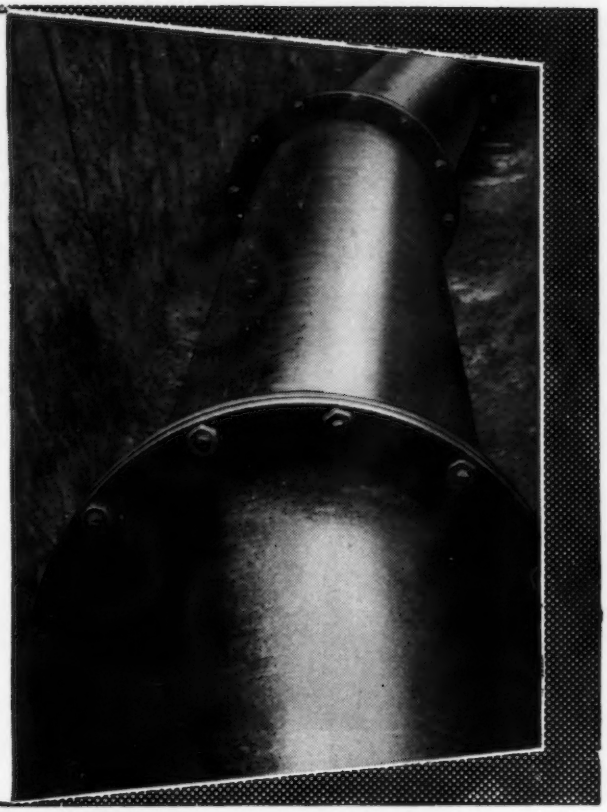

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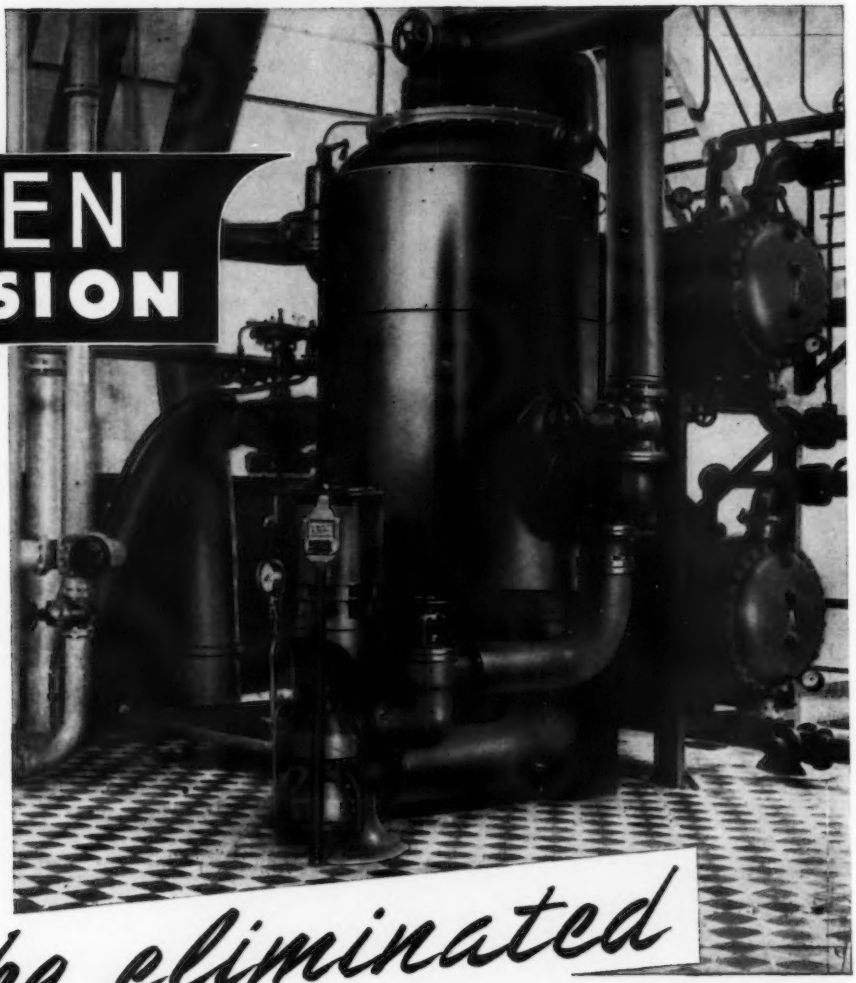

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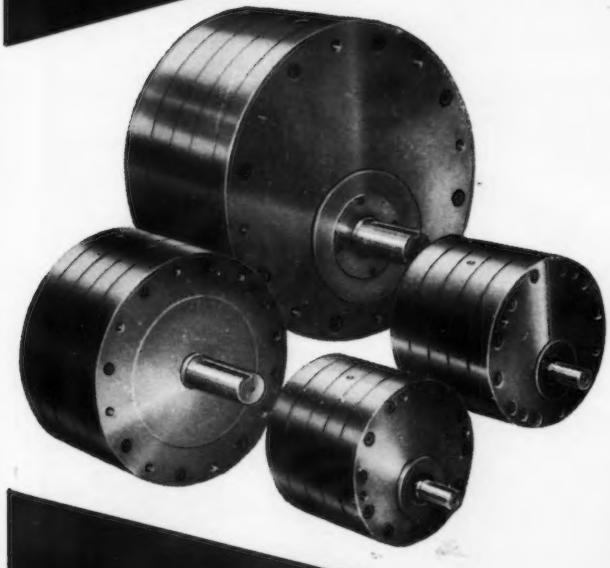

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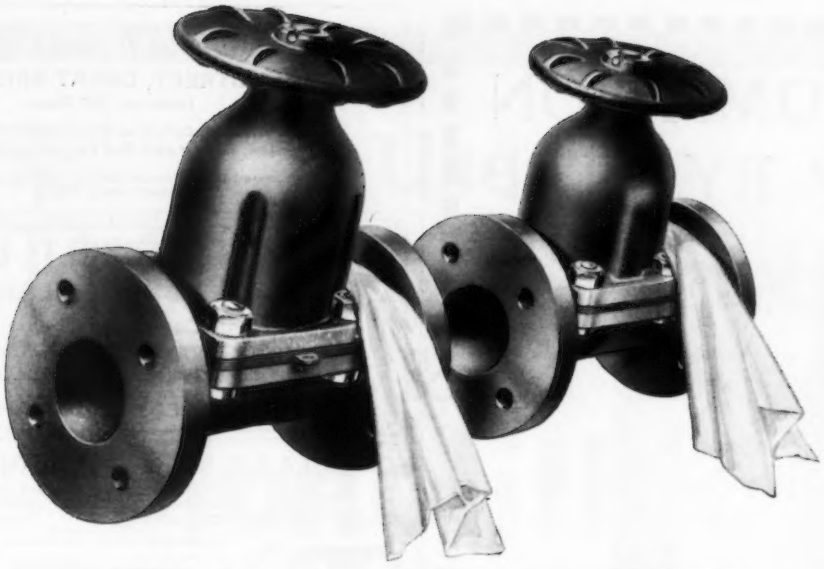

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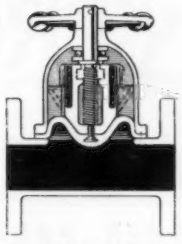

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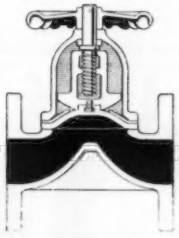

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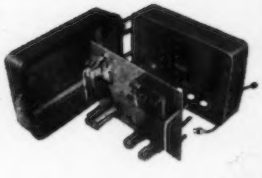

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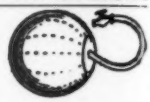

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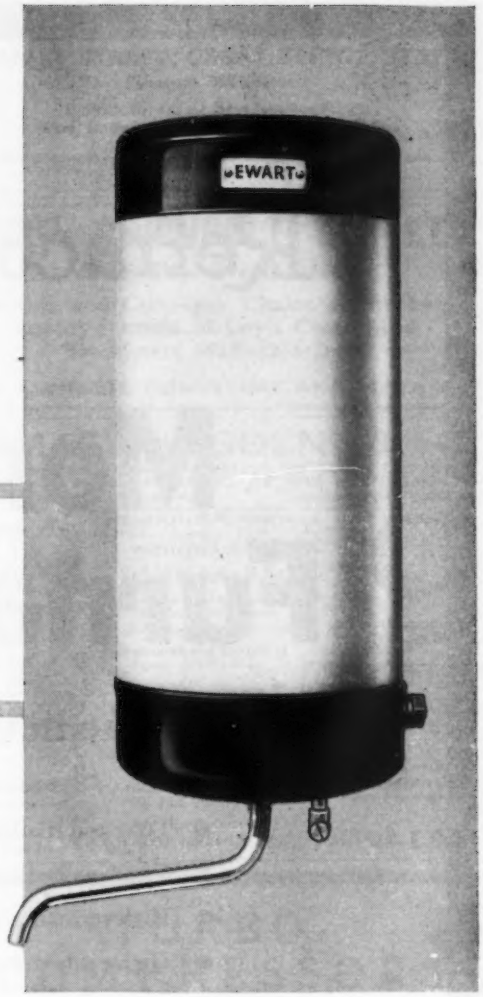

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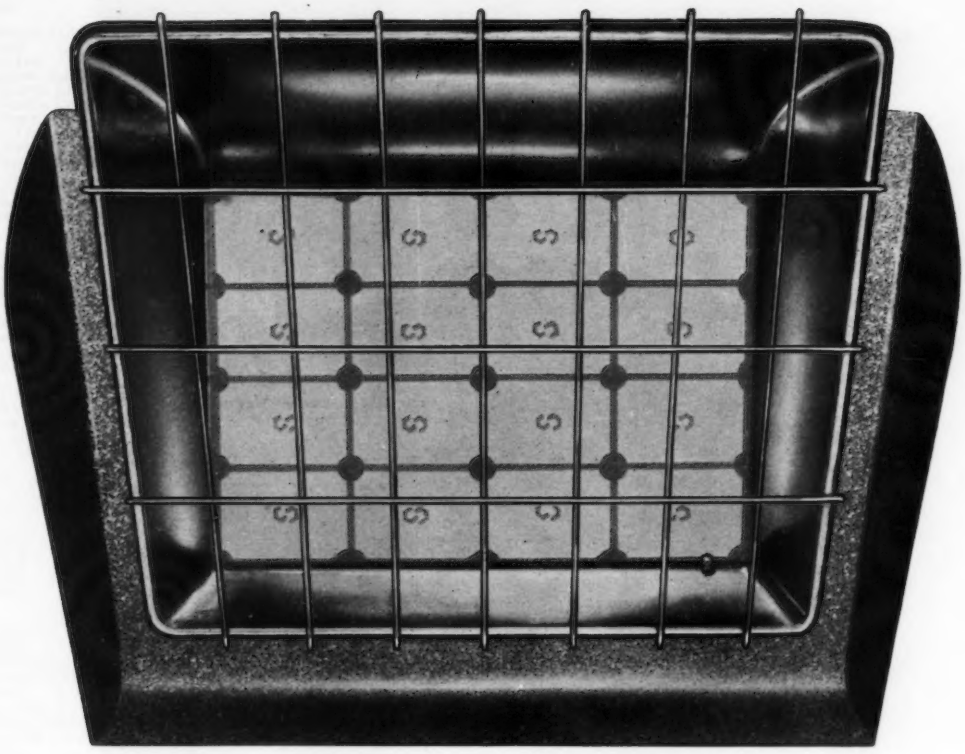

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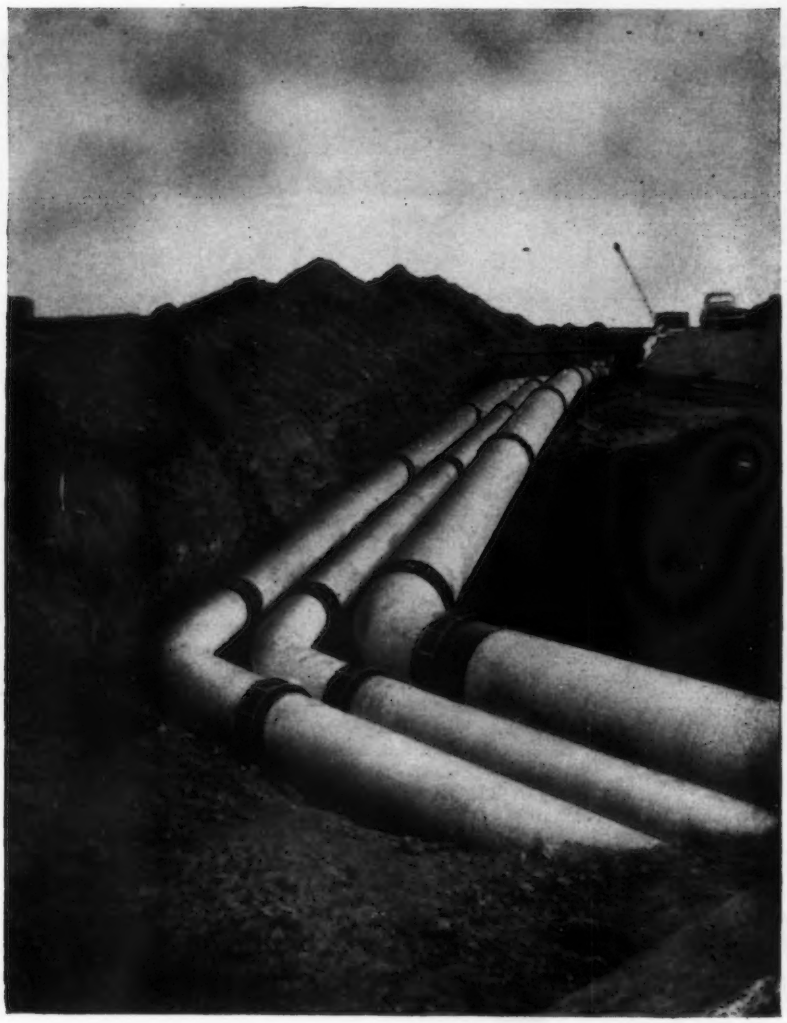

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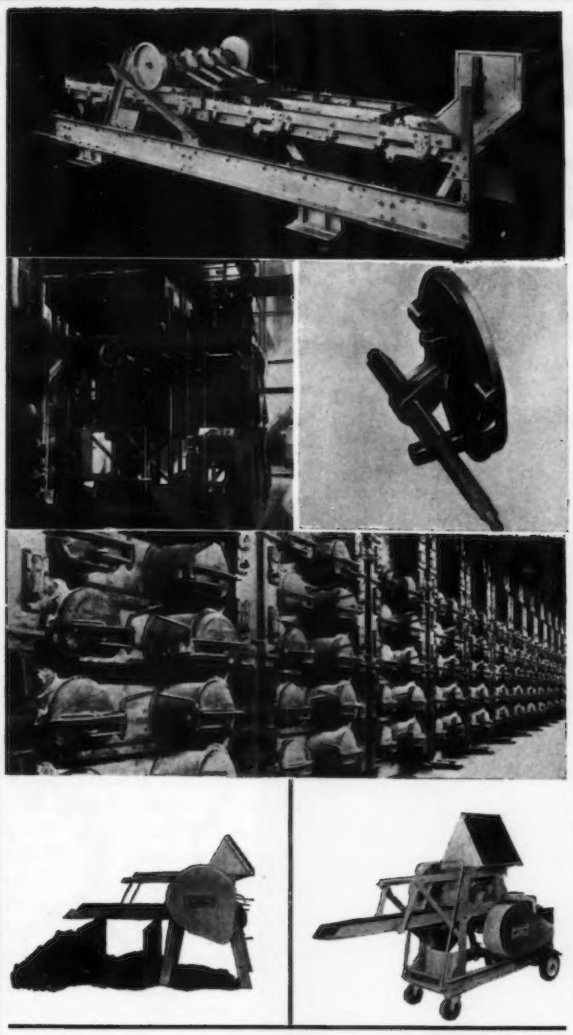

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Gas Journal

VOL. 288 NO. 4869 November 7, 1956

108TH YEAR

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Gas Journal

VOLUME 288. No. 4869. NOVEMBER 7, 1956. 108th YEAR

The Avenue Coking Plant

ON October 30 the Avenue Coking plant of the North Eastern Division of the National Coal Board at Chesterfield was opened by Mr. Aubrey Jones, the Minister of Fuel and Power, and in this issue of the 'GAS JOURNAL' will be found a detailed description of the plant, which is a striking example of the modern aim in economic production of refined fuels. At Avenue the only raw materials entering the plant are coal and part processed raw materials from satellite plants, which were sufficiently modern to be retained at the time of nationalisation to supplement the supply to this modern integrated plant with their more valuable by-products for working up. There is no import of energy, since all steam is raised from breeze burning boilers, and there is no import of electricity—in fact there appears to be no connection with the electricity board grid system, as all power is generated on the spot from locally raised steam. There is, however, a considerable export of very valuable products. First and foremost, the chief products are coke and gas, in that order. The coal carbonised in the coke oven batteries is a blend of locally mined coals, none of which would be considered as their first choice among gas engineers, but which, under the conditions of blending and carbonisation at Avenue, yield a sufficiently reactive coke to be suitable for domestic and industrial use, with the alternative choice to change to the production of metallurgical coke should the economic conditions or national demand make it necessary to do so. Gas of a calorific value somewhat higher than that demanded by the East Midlands Gas Board is available in large quantities, and this is diluted with locally generated producer gas to bring it down to the declared value before it is pumped into the local 24 in. grid main; but the volume available for export only amounts to about 60% of the total gas made, since 40% must be returned to the coke ovens for under firing. The economics of the gas industry are linked to gas production and distribution and the service involved in supplying this commodity, while the economics of the coking industry are naturally linked to the manufacture and supply of coke, with gas as a very valuable by-product, which the area gas boards are generally very ready to buy. The N.C.B. policy of building large coking plants near their own collieries, makes for cheap freights, which are the envy of the gas industry; it also makes the chemical integration of the works for the working up of all by-products both a physical and economic possibility. No gasworks outside the largest London Metropolitan Thames-side gas manufacturing stations would consider the working up of tar, benzole, tar distillation products and sulphuric acid to the extent practised at Avenue, as they simply would not have the markets for the gas, or be able to afford to bring the coal so far from the coal fields to distant corners of the United Kingdom, connected only by rail or road.

Although the demand for a suitable domestic coke is likely to increase enormously in the next 15 years as the Clean Air Act gathers momentum, and although the gas industry will be forced to pay as much attention to the production of a suitable coke as it does now to a suitable and constant quality of gas, it is unlikely that works of such magnitude and all-embracing refining capacity will be the choice of the area boards. Their aim will be to develop the building of works of optimum size and with full thermal integration, with the object of making gas with as little additional fuel expenditure as possible, of making as great a quantity of good quality coke for sale as possible and of consuming otherwise useless breeze in producer gas production. The by-products would continue to be sold for working up as is done now. In the past the coking industry has always been glad to dispose of its gas production to a willing buyer in the shape of the gas industry for distribution to the general public, but should the demand fall at off-peak hours, or in hot weather in mid-summer, the

coking industry, in the past at any rate, would quite cheerfully flare its gas to waste, if it could find no better use for it. The gas industry could not consider doing any such thing, but it is thinking of firing its own retort settings on coal gas. Provided the economic climate is favourable, and provided that the demand for coke really justifies this somewhat revolutionary idea (though it was done on the continent 25 years ago), it is a sound proposition. The carbonising plant will be kept at its most efficient working level and the retort house working will more nearly approximate to coke oven working of constant flue temperature, constant throughput and the letting down for resetting only at the end of a long and useful life.

There is no doubt about the policies of the Ministry of Fuel and Power and the National Coal Board on the matter of clean air and the best possible use of our indigenous raw materials, and how the Avenue plant will contribute towards these policies. The Minister in his speech at the opening ceremony was most emphatic in his stress for the need to implement the Clean Air Act, both from the view of public health and the availability of fuel. For the success of these two policies he was sure that 'as a private citizen and as a sufferer from the pollution of London I cordially welcome the Clean Air Act. But in my official capacity I welcome it even more, for one of my duties is to secure economy and efficiency in the use of fuel. That is precisely what the Clean Air Act helps to do. A dirty smoky atmosphere means that some of the valuable properties of coal are being wasted.' But how is this to be done, how are the public going to be persuaded? The Minister went on, 'There is one other reason why I welcome the Clean Air Act. One cause of the smoky air is that cherished institution, the old-fashioned open coal fire which can only burn large coal, the one thing which is becoming scarcer and scarcer. More up to date open fires will burn smaller coal and will burn smokeless fuel as well; again the Clean Air Act.' The Minister went on to talk of the alternative forms of smokeless fuel, referring chiefly to the solid rather than the gaseous, but he referred to the work being done in upgrading small coal of which there is now such an abundance caused by mechanical mining methods, by briquetting and production of the carbonised ovoids; but unfortunately the productive capacity was as yet inadequate. At the new Avenue works, however, there was a potential source of supply of domestic and industrial coke of good and suitable quality, as great or greater than anything hitherto. The Minister referred to one of the most difficult points on which to convince the public when he said, 'I am of course aware of the complaints which the domestic consumer makes about the price of coke. He cannot understand why the price appears so much dearer than the price of coal. The operative word is *appears* for in fact coke is no dearer than coal.'

In his speech replying to the Minister, the Chairman of the National Coal Board expressed sentiments that we feel should be shared by everyone, whoever he may be, whether he is interested professionally in fuel supply, its consumption, or its conservation, or is simply interested as a private citizen. We can all be cold, and all want warmer houses at a lower cost, and we all hope for the continued expansion of industry at its present rate. Mr. Bowman, after describing the achievement of the Avenue project as the investment not only of the Board's resources but of the country's which are the 'fruits and genius of the people of this country,' went on to say: 'Every man, woman and child in this country is a consumer of fuel and energy. And if we are to master the situation (caused by the shortage of energy) all must do what is required of them. They must cast aside the traditions of centuries and they must make adjustments in their standards of value. Nothing less than this will do.'

But how can the whole population be persuaded, for there must be no compulsion to change their habits of fuel consumption to fit in with the drive for better use of our fuel resources? Mr. Bowman's answer is that the public should be provided with alternative types of fuel, the products of the carbonising industries. But these products must be just as easy to handle and as easy to manage in modern equipment as any old-fashioned crude coal. It must be the aim of those in the fuel industry to provide the general public not only with something that is as good but something very much better. It is then that the advantages of the Clean Air Act will be seen by everyone and through the thought and planning put into our carbonising plants, either in the gas industry or the coking industry, each and everyone of us will begin to reap the rewards of a more pleasant place to live in and an assured standard of everything we would like to take for granted.

Loose Labels

WHAT'S in a name? Precious little according to the realists. And yet . . . we are not so sure. We have been thinking a lot about names, or rather titles, lately. Not since nationalisation has there been such a flurry of changing titles, and although we are prepared, with some reluctance, to accept the fact that changes are necessary, we view the official *choice* of some of those titles with both astonishment and dismay. It is reasonable enough to expect that the steady, though patchy, progress of integration and centralisation throughout the industry will create new posts and render existing ones unnecessary. In many cases the titles of employees at all levels need revision. One of the less happy results of this streamlining process is the apparent possession by hydra-headed authority of an overwhelming desire to 'pigeon-hole' everybody. Everyone must have a label, and although many labels are flattering, some are quite the reverse. For example, the jack-of-all trades who if not the salt of the earth is often the salvation of the gas-works, after years of doing very necessary jobs which were nobody else's responsibility, finds himself classed as a 'labourer.' Which of course he is, strictly speaking, but his label gives no hint of the fact that he occupies an almost unique position of which he is justifiably proud. Not surprisingly he regards his label as wounding and something of an insult.

That is one end of the scale. Now let us look at labels on a different and higher plane. Take the engineer, the qualified man who trained with the object of pursuing his profession to the limit of his capabilities. Very naturally most engineers like engineering; they know that it is possible to reach a very eminent position without being anything but an engineer. That goes for the gas engineer, too, but on the whole his chances

are dwindling. There are fewer works at which he can serve as an engineer, but—and this is the point—there are frequently opportunities for him to be sidetracked into a *managerial* post. Now there is a lot of difference between a manager and an engineer. The man in charge of a whelk stall is entitled to call himself a manager, the position carrying no obvious and generally recognised qualifications. The gas engineer and manager of pre-nationalisation days had the dignity of the term 'engineer' plus a title which explained his extra responsibilities in the complete running of a gas undertaking. Many a divisional general manager in the industry today is a qualified engineer, but there is nothing in his title to distinguish him from a non-engineering man. And that, we think, is a pity.

However, it is not with the title of D.G.M. that we are really concerned. Much worse is the engineer who has been re-christened 'superintendent.' No loss of salary or responsibility may be involved but from the viewpoint of personal prestige the effect is disastrous. It is small consolation to the man thus labelled that his board superiors and equals understand the position; to other employees, particularly the manual workers, the new name clearly implies demotion. Indeed, we believe cases exist in which an engineer has been appointed 'superintendent' at a works in which that title formerly applied to a junior man in a subordinate position. It is not as though the matter was limited to misinterpretation and loss of face within the industry. What of the public? Is it not important that a man bearing the responsibility of engineer-in-charge at a gasworks should carry a title worthy of that responsibility?

We hope gas boards will give serious thought to this matter and recognise the dangers of robbing their staff of the form of designation to which they are entitled.

Esso Considers New Refinery

SIR LEONARD SINCLAIR, Chairman and Managing Director, has announced that the Esso Petroleum Co. Ltd. are seeking permission for the industrial development of approximately 1,000 acres of land in the Milford Haven area. Sir Leonard went on to explain that Esso are considering plans for the building of a new major oil refinery.

The plans for the proposed refinery provided a capacity of 5 mill. tons per year and berthing space for tankers of the largest foreseeable tonnage. Construction of the refinery would require 5,000 men and would take two and a half years to complete.

Esso Petroleum Company already owns and operates the largest oil refinery in the British Commonwealth, at Fawley, near Southampton. A development scheme for Milford Haven, which would cost between £13 and £15 mill., and would enable the port to handle tankers of 100,000 tons, was recently put before the Prime Minister, and was referred by him to the Minister of Transport.

Mechanically Operated Handscrapers

THE German State Railways provide self-discharging hopper trucks for coal, chemicals, building material, etc., reports a recent issue of *Das Gas-und Wasserfach*. However, their number has proved insufficient and recourse has been taken to the use of motor-driven handscrapers. Apart from their being adaptable and cleaning the average open or closed truck to the last grain without the use of shovel, they are an improvement on grabs whose teeth may damage the bottom of the trucks and which, in the end, require finishing by shovel. As an example, the Halberger Hütte steelworks consumes monthly 10,000 tons of coal or coke. Conditions here are ideal as the material drops from the truck straight into low-level bunkers. However, with the addition of chutes, elevators or lorries can be loaded just as easily. At this works two men are employed on this work, taking it in turn with the scraper. Between them they unload 480 tons in an eight-hours day. The saving per month comes to DM.1,000 (about £850). For closed wagons with only a partly open side the scrapers are fitted with an extension arm which reaches to the furthest corner.

Correspondence

At last!—now it's off the Secret List

DEAR SIR,

I enjoyed your October 17 issue very much and the transport supplement in particular. What a shame that you could not have had the full co-operation of all the Gas Boards.

All the way through the article I hoped that I should find a photograph of what I remember to be an old model 'T' Ford truck which was in service at the Newton Abbot Gasworks until quite recently. It must be one of the most interesting vehicles in the industry and it should have quite a story to tell.

Could the South Western Gas Board be prevailed upon to release this information or is it still on the secret list?

Yours faithfully,

'ANTIQUARIAN.'

Harrogate,
October 19, 1956.

'Antiquarian's' letter prompted us to get in touch with the Transport Manager of the South Western Gas Board, who has kindly loaned us this picture of the old model 'T' Ford truck. He states, however, that it was not, in fact, either the Gas Company or the Gas Board property. It belonged to a Mr. Albert Symonds, who retired from business in Newton Abbot District some three years ago. The Ford was operated by him for some 30 years, mainly in connection with the distribution of coke, of which it must have handled some thousands of tons. One of the claims made by Mr. Symonds is that this lorry was the first vehicle ever to be loaded by mechanical means at the Newton Abbot Gasworks. When Mr. Symonds retired the vehicle was sold and is believed to be still working somewhere in Somerset.

Personal Notes

Mr. H. E. Wilks, Divisional Supplies Officer to the Watford Division of the Eastern Gas Board, is taking up an appointment on the North Western Divisional Board of the National Coal Board. Mr. Wilks joined the former Watford and St. Albans Gas Company in September, 1937, as a clerk in Watford District office. He served during the war in the Royal Navy, and on demobilisation, rejoined the Company as assistant to the District Engineer. In December, 1948, he was appointed Supplies Officer to the Company and set up a central purchasing organisation. Upon nationalisation his duties were extended as Divisional Supplies Officer, to cover the Companies constituting the Watford Division. Mr. Wilks is an Associate Member of the Institution of Gas Engineers and a Member of the Purchasing Officers' Association. In addition he has held, since 1954, the post of Honorary Secretary and Treasurer to the Eastern Junior Gas Association.

MR. J. C. IRMINGER, who, as we reported last week, has just retired after 50 years' service in the gas industry, in fact relinquished his General Managership of Bergen gasworks four years ago. Since then MR. BJORN PAULSON has been Director of the works.

The following appointments are announced by the South Western Gas Board:—Cheltenham Division: Cheltenham District, A. J. JELLIS, Evesham Branch Manager; C. DADGE, Pershore Branch Supervisor; J. BRADFORD, Broadway Branch Supervisor; E. J. TANDY, Tewkesbury Branch Supervisor. Gloucester District, W. N. BUTLIN, Stroud Branch Manager; E. W. WHITE, Cinderford Branch Supervisor; K. C. PARGETER, Ross Branch Supervisor; L. C. R. BUTT, Lydney Branch Supervisor; C. F. MATTHEWS, Dursley Branch Supervisor; C. W. WELLS, Nailsworth Branch Supervisor. Swindon Division: Swindon District, H. T. C. POOLE, Cirencester Branch Manager. Bristol/Bath Division: Bath District, C. F. SMITH, Chippenham Branch Manager; S. C. HUXHAM, Trowbridge Branch Manager; S. G. R. HAYES, Devizes Branch Supervisor; R. J. NORMAN, Melksham Branch Supervisor; A. A. BLUCK, Midsomer Norton Branch Supervisor; R. W. J. CHURCHILL, Warminster Branch Supervisor; P. J. TONG, Frome Branch Supervisor. Weston/Taunton Division: Weston District, W. J. HURN, Clevedon Branch Manager; W. J. COX, Burnham-on-Sea Branch Supervisor; Yeovil District, E. C. CARTER, Glastonbury Branch Manager; P. G. HOLLEY, Chard Branch Supervisor; H. E. WOOD, Shepton Mallet Branch Supervisor; A. E. HANDCOCK, Martock Branch Supervisor. Taunton District, N. R. TAYLOR, Bridgwater Branch Manager; R. H. BAWN, Minehead Branch Supervisor. Torquay/Exeter Division: Torquay District, A. E. BULEY, Brixham Branch Manager; H. J. BOND, Newton Abbot Branch Manager; C. D. WORDEN, Teignmouth Branch Manager; H. J. OWEN, Totnes Branch Manager. Exeter District, H. W. LOCK, Exmouth Branch Manager; F. R. SERLE, Sidmouth Branch Manager; A. D. WRIGHT, Tiverton Branch Supervisor. North Devon District, C. D. SIMPSON, Bideford Branch Manager; R. M. STADDEN, Ilfracombe Branch Supervisor. Plymouth/Cornwall Division: Plymouth District, W. E. WILLIAMS, Bude Branch Supervisor; W. J. EASTLAKE, Tavistock Branch Supervisor; C. N. LANG, Looe Branch Supervisor. Cornwall District: R. L. D. MEDLIN, St. Austell Branch Manager; N. C. LANGFORD, Penzance Branch Manager; J. S. H. POLMEAR, Truro Branch Supervisor; E. G. RUNDLE, Newquay Branch Supervisor. The 13 Districts within the six Divisions are now as follows: Cheltenham Division: Cheltenham (District Engineer and Manager F. L. WHITEHURST), Gloucester (W. A. CHARD); Swindon Division: Swindon (A. B. HORSFIELD); Bristol-Bath Division: Bristol (F. C. Gay), Bath (E. ANNAKIN); Weston-Taunton Division: Weston-super-Mare (T. A. NICHOLSON), Yeovil (T. PORTER), Taunton (F. G. CRAXFORD); Torquay-Exeter Division: Torquay (O. PINCOCK), Exeter (C. H. GILBERT), North Devon (W. VERITY); Plymouth-Cornwall: Plymouth (A. MARSHALL), Cornwall (R. J. WILLIAMS).

Obituary

MR. CHARLES PETER BATEMAN, Manager of the Bath sub-division of the S.W. Gas Board up to two years ago, and before that Managing Director of the old Bath Gas Company, has died aged 56. Son of a colliery owner, Mr. Bateman was a Member of the Institution of Gas Engineers and of the Institute of Fuel. He was first articled in Leeds Corporation Gas Department, but his work was interrupted by the first world war, in which he served as a flying officer. His articles were resumed at the Beckton works of the Gas Light and Coke Co. He was appointed an Assistant Engineer to the Company in 1922, later moving to the Cardiff Gas Company. In 1925 he first went to Bath to take up an appointment as Assistant Engineer and Manager to the Bath Gas Company. He remained there for eight years and then went to the Harrogate Gas Company. There he helped to form the York-Harrogate and District Group of Gas Companies, and was appointed a Director of the United Kingdom Gas Corporation. In 1945 he returned to Bath as Engineer and General Manager. The following year he became a Director and in 1948 he was appointed Managing Director. In 1949, when the gas industry was nationalised, Mr. Bateman carried on in a similar capacity. He retired in March, 1954, in accordance with his agreement with the old Bath Gas Company.

MR. WILLIAM CHRISTIE CAMPBELL, President of the Scottish Association of Gas Managers, died on October 30, aged 48. Mr. Campbell, who was born at Falkirk, was apprenticed in the Falkirk Corporation Gas Department in 1924. From 1931 to 1935 he was Deputy Engineer and Manager, Helensburgh Corporation Gas Department. He then became Manager of the Buckie Gas Light Company; taking over Management of the Galashiels Gas Light Company in 1938; and of the Galashiels & Selkirk Gas Company in 1945. In 1949 he was appointed Sub-Group Manager, Scottish Gas Board; and in 1953, District Manager, Paisley District, Western Group, Scottish Gas Board. Mr. Campbell was unable, owing to ill-health, to officiate as President at the autumn meeting in Largs of the Scottish Association of Gas Managers, MR. W. M. GLEDHILL (Stirling) deputising for him.

Diary

November 8.—NORTH OF ENGLAND SECTION I.G.E., joint meeting with Northern Juniors: Demonstration Theatre, Gas Showrooms, Tubwell Row, Darlington. 2.30 p.m. 'Some Technical Aspects of the Gas Industry in America,' by W. R. Garrett.

November 8.—INCORPORATED PLANT ENGINEERS, GLASGOW BRANCH: Scottish Building Centre, 425-427, Sauchiehall Street. 'An Introduction to Atomic Energy.' 7.15 p.m.

November 9.—SCOTTISH WESTERN JUNIOR GAS ASSOCIATION: Gas Showrooms, 522, Sauchiehall Street, Glasgow, C.2. 6 p.m.

November 9.—SOUTH EASTERN G.C.C., KENT SUBURBAN DISTRICT: Bell Green, Lower Sydenham. 2.30 p.m.

November 10. — WESTERN JUNIORS: East Yelland Power Station, Central Electricity Authority, Bideford. 2 p.m. Inspection of plant. 3.30 p.m. Royal Hotel, Bideford. Paper, 'The Chemical Control of a Base Load Station,' by D. R. Jones.

November 13.—WOMEN'S GAS FEDERATION, 12th Branch Conference: Victoria Hall, Bloomsbury Square, Holborn, W.C.1. 10.30 a.m.

November 13.—MIDLAND JUNIORS: Staff Messroom, West Midlands Gas Board, Birmingham District, Council House, Birmingham.

November 13. — INCORPORATED PLANT ENGINEERS, MANCHESTER BRANCH: Engineers' Club, Albert Square. 'Lubrication and Selection of Lubricants.' 7.15 p.m.

November 14. — EASTERN JUNIORS: G.A.S. Club, Willoughby Lane Gasworks, 10.30 a.m. Visit to Works of Wm. Press & Son Ltd. Lunch at G.A.S. Club. Conducted tour of coal handling plant, Willoughby Lane Gasworks.

November 14. — SOUTH EASTERN G.C.C., KENT COUNTY DISTRICTS: King Street, Maidstone. 2.30 p.m.

'ALARM AND DISMAY' IN SCOTLAND

New Glasgow Division Posts are Criticised in the Press

'ALARM' and 'dismay' have been expressed in letters to the Editor of the 'Scotsman' over the creation of six new posts in the Glasgow Division recently advertised by the Scottish Gas Board.

'It appears that the people of Glasgow must be becoming gas conscious,' observes one writer. 'It is to be hoped that they will now receive better supplies,' he continues. 'But is it likely?'

'If it is essential for one section of one public industry to offer such an array of vacancies one can only assume that the prospects of promotion in the public service are good.

'However, the cost in salaries and pensions is alarming. Is it too much to hope that someone with the required will and authority may cause an inquiry to be made on the basis—Is this appointment necessary?'

Another writer notes the advertisement of the vacancies with 'dismay' and states: 'At one time there are six posts vacant, three of which carry salaries of between £1,000 and £2,000 and three of over £2,000. As this is only one division of a very large national board, the list opens up some idea of the number of highly-paid positions there must be throughout the country.

'It would seem to be unnecessary extravagance to have entirely separate offices, staff, and showrooms for gas and electricity.

'Also, the conducting of expensive advertising campaigns aimed against each other by two sidlings of the same family surely cannot be justified. I should like to see one showroom in which all cooking and domestic appliances, including coal-burning appliances, were demonstrated and advice given on all three methods, one meter reader, and one account.'

The new posts are: Divisional Controller of Production and Technical Services; Divisional Controller of Sales; Divisional Controler of Finance and Administration; Divisional Controller of Stores, Purchasing, and Transport; Manager, Organisation, Research, and Planning Section; and Divisional Personnel, Welfare, and Training Officer.

New Company Formed

Humphreys & Glasgow (Canada), Ltd., has been incorporated as an associate company of Humphreys & Glasgow, Ltd., of Humglas House, Carlisle Place, London, S.W.1. The address of the new company is 837, Eglington Avenue West, Toronto 10, Ontario, and its activities entail engineering and plant construction for the gas, petroleum, chemical and other process industries. Apart from the Board of Directors, the principal executives of the new company will be Mr. Peter de Gray, Vice-President, Sales, and Mr. C. T. Hawkes, Vice-President, Engineering.

Mr. Therm at Cardiff

Mr. Therm featured in the celebrations, proclaiming his 135 years' service to the city, when 700 representatives of public life in Wales attended Cardiff City Hall to celebrate its declaration as capital of the principality and the conferment of the City's freedom on Major Gwilym Lloyd-George, Home Secretary and Minister for Welsh Affairs.

From Pupil to Deputy Chairman in 32 Years

AS reported briefly in our 'Personal' column last week on information received as we were going to press, Mr. William Hodkinson, O.B.E. (pictured above), has been appointed Deputy Chairman of the North Western Gas Board.

It is now 32 years since Mr. Hodkinson began work as a 15-year-old pupil of the Board's first Chairman, Colonel W. Moncrieff Carr, C.B.E., then General Manager of the Stretford and District Gas Board. He gained his early technical education at the Salford Royal College of Technology.

Mr. Hodkinson's understanding of industrial gas problems began at Stretford Gasworks, where he became a Technical Assistant in 1930, and was appointed Assistant Works Manager in 1932.

While he was at Stretford the sales of gas trebled, mainly because of the then revolutionary policy adopted by the undertaking of offering a specially cheap price for gas sold in bulk to industry.

On the formation of the United Kingdom Gas Corporation in 1935, Mr. Hodkinson was appointed its Chief Technical Officer; in 1939, at the age of 30, he became General Manager, and in 1946 was appointed Technical Director and General Manager. As such he was responsible for the design and construction of the West Yorkshire gas grid, as well as for a number of major gasworks projects.

Mr. Hodkinson has held a number of honorary appointments in the gas industry. From 1943 until 1945 he was a member of the North Western Regional Gas Engineering Advisory Committee set up by the Ministry of Fuel and Power during the war, and in 1946-47 he served on the Ministry's South Wales (Eastern Area) Gas Grid Committee. As Technical Adviser he was responsible for the preparation of the Committee's report.

From 1944 until 1947 he was a Member, and subsequently Chairman of the Board of Examiners of the Institution of Gas Engineers. He also served on the Institution's Education Committee.

Directly after the war he was selected by the Ministry of Fuel and Power to be one of a team of observers sent to Germany, where he made a special study of the extensive Ruhr gas grid, and closely examined German methods of making smokeless fuel and converting coal into gas, coke, oil, and petrol.

Appointed to Panel

In July this year he was appointed to a Gas Council panel which included Sir Harold Smith, Chairman of the Gas Council; Sir Henry Jones, Deputy Chairman; Mr. E. Crowther, Chairman of the Northern Gas Board; Mr. W. K. Hutchison, Chairman of the South Eastern Board; Sir Charles Ellis, Scientific Adviser to the Gas Council; and Dr. F. J. Dent, Director of Research at the Midlands Research Station of the Gas Council, to examine the commercial possibilities of a plant for the production of gas from oil based on the hydrogenation process.

Mr. Hodkinson, who is a member of the Institution of Chemical Engineers and of the Institution of Gas Engineers, received the latter Institution's Bronze Medal in 1935 and its Gold Medal in 1947. He was awarded the O.B.E. in the 1952 New Year Honours List.

His home is at Sale, Cheshire; he is married and has a grown-up son.

DEPUTY CHAIRMAN OPENS NEW HOLDER AT BURY ST. EDMUNDS

£200,000 Development Plan Completed

COMPLETING a development scheme which has nearly doubled the output of the works, a new gas holder was opened by Mr. J. H. Dyde, Deputy Chairman of the Eastern Gas Board, at Bury St. Edmunds on October 20. Manufacturing plant and the distribution system have been thoroughly overhauled and extended, and new mains laid include a trunk main supplying the Mildenhall Road housing estate.

The new holder, made by Firth Blakeley Sons and Co., Ltd., Church Fenton, Yorks, has a capacity of .75 mill. cu.ft. and holds enough gas for about 20 hours' consumption on a winter's day in Bury St. Edmunds. It is a spiral guided, three lift type in steel tank, on concrete piled foundations, 117 ft. in diameter carried out by the Franki Piling Company.

Mr. Dyde was assisted in turning on the gas from the new holder by the Mayor of Bury St. Edmunds, Mr. Aubrey Wilks. After welcoming Mr. S. J. M. Sampson, Chairman of the former Bury St. Edmunds Gas Company, Mr. Dyde said that prior to the advent of the new holder, they were down to storage of about 3½ hours' supply. That showed how important the new gasholder was.

Latest Design

The latest construction design was incorporated in the holder. It was built with the precision of a machine, yet 600 tons of British steel had gone into it, and the tank in it contained 1.6 mill. gal., or 8,000 tons of water. The concrete slab on which the holder stands necessitated the driving of 354 piles each of which would carry 45 tons.

The cost of the whole development scheme, Mr. Dyde revealed, was about £200,000. 'It is evidence of our faith in the future of gas as a clean and smokeless fuel,' he concluded.

Gas first came to Bury in 1834 with the establishment of a private undertaking. Bury St. Edmunds Gas Company bought the undertaking in 1849 for £8,500, when gas was 10s. per 1,000 cu.ft.

When the Company celebrated its centenary in 1934, the make of gas at that time was 96.78 mill. cu.ft. and the number of consumers was 3,595, the output of gas having increased by 58% and the number of consumers having almost doubled.

Now, after 22 years, the make of gas is 218 mill. cu.ft. and the number of consumers 5,626—increases respectively of 130% and nearly 69%. Each consumer uses nearly 50% more gas.

'Showpiece' Gasworks is Closed

MALPAS, Cheshire, gasworks was closed on October 24, and from now on consumers in the area will be provided with a supply pumped from the new £40,000 plant installed at the Whitchurch works at Sherrymill Hill. This is expected to result in increased efficiency and an improved supply.

In future one stand-by employee only will be required at Malpas instead of two as hitherto. Malpas holders will still be used for reserve storage purposes.

'Much in Little'

Malpas Gas Company was formed in 1857 and was one of the first companies to be registered as a limited liability company under the Act. From its formation until 1937 it carried on as a private limited liability company, and for about 25 years was under the management of the late Mr. H. A. Crowther.

In 1937 the Company was taken over by the Severn Valley Gas Corporation, which modernised the village gasworks until it became a show piece of its kind. Among other improvements the Corporation added two high pressure gas holders to the then existing low pressure holder, and the undertaking came to be regarded as a 'much in little' example of all that a gasworks should be.

COLLIER SKIPPER DIES TRYING TO SAVE SHIP

WHILE fighting to save his ship, Captain Arthur Hill, master of the 1,598-ton collier, Wimbledon, was lost overboard last week. The vessel later sank off the Norfolk Coast.

Captain Hill, who was 45 years of age, had gone forward to try to find out why the ship was taking in water when a wave swept him into the sea. He was picked up by another ship, and a Royal Air Force helicopter lowered a doctor to the rescue ship, but he was found to be dead.

The vessel was carrying coal from Sunderland to London for the South Eastern Gas Board at the time. Captain Hill came from South Shields.

GAS AS A CAREER

Apprentice gas fitter Gwyn Hoskin, with Leonard Sparrow, gas industry instructor, demonstrating on the Gas Council stand at the 'Boys in Industry' Exhibition arranged by the National Association of Boys' Clubs, at the Tea Centre, London.

LECTURES ON GAS AT UNIVERSITY

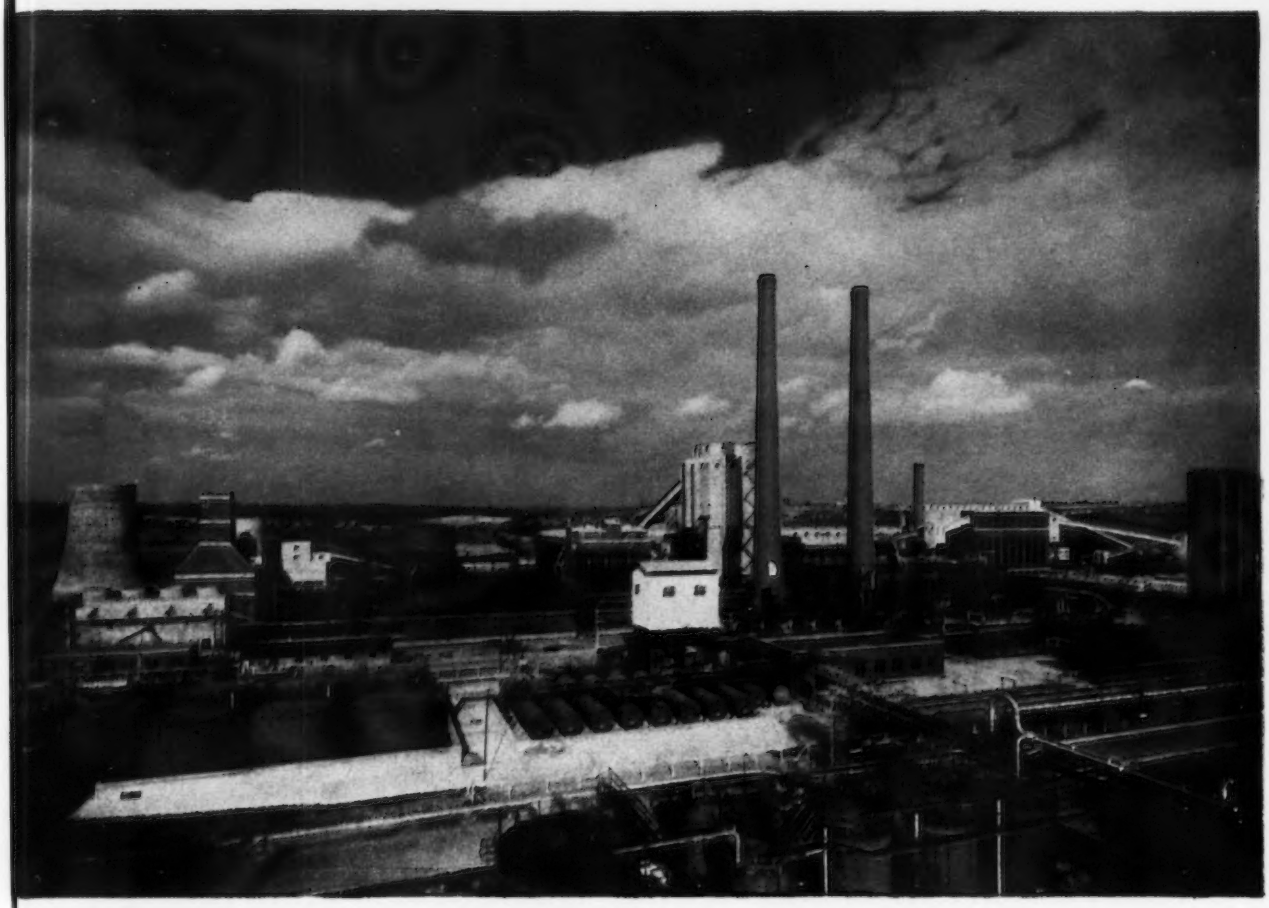
Included in the University of Leeds 1956-57 autumn session is a series of four lectures on gasification practice by Mr. N. H. Williams. The syllabus includes: Recent developments of water gas technique; recent developments in complete gasification; catalytic oil gas production; and fluidisation. Also included in the new programme are a series of four lectures by Mr. P. Bradley on by-product coking processes.

Among grants and donations acknowledged by the council of the University recently were the following for the Department of Coal, Gas and Fuel Industries: £2,000 for 1955-6 from the Gas Plant Manufacturers' Development Council; £450 for 1956-7 from the British Coke Research Association; and £150 for 1955-56 from the Leeds Fire Clay Co., Ltd.

BRITISH OXYGEN

THE Lancashire District of British Oxygen Gases Ltd. held its first-ever 'open day' at the Worsley (Manchester) headquarters on October 20. Over 140 members of staff and their relatives and friends visited the works and saw the production of the Company's industrial and medical gases.

Welcoming the party, Mr. R. D. Watson, Manager of the Lancashire District, explained that the visit had been organised in an effort to strengthen the relationship between management and employees.



The Avenue Carbonisation and Chemical Plant of the National Coal Board, East Midlands Division

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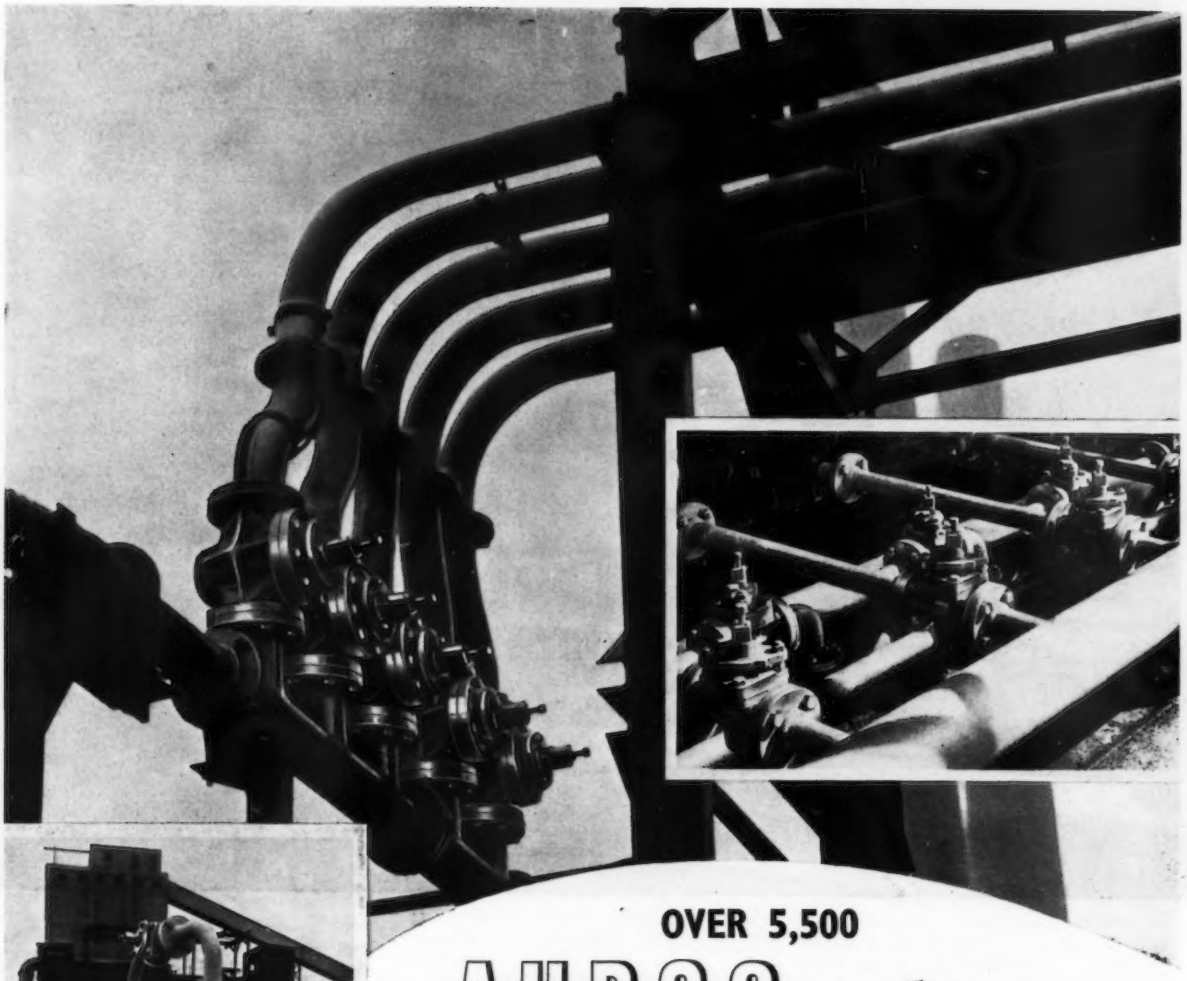

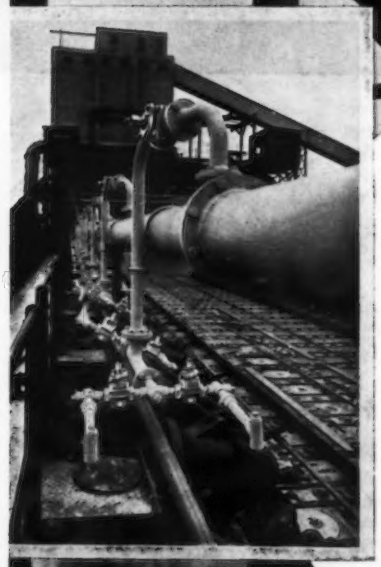

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The N.C.B.'s Avenue Carbonisation Plant, reviewed in this issue, is one of the most modern coking plants and the largest of its kind owned by the National Coal Board. In this vast £10 million project—designed to produce 24 million cu.ft. of gas daily, over 500,000 tons of smokeless fuel annually, and numerous by-products—most careful consideration was given to choice of plant and equipment. Altogether, more than 5,500 Audco Lubricated Valves have been installed to handle the many corrosive and difficult services encountered in a works of this kind.

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Control equipment and switchgear

at AVENUE

Power House Control Room at Avenue Carbonisation and Chemical Plant showing the ALLEN WEST control panel related to Class "0B13H" 3.3 kV 100 MVA A.S.T.A. tested switchgear. Photo by courtesy of Messrs. Woodall-Duckham Construction Company Ltd.

We congratulate the National Coal Board on a magnificent achievement and take pride that all 3.3 kV switchgear and a considerable proportion of the motor control equipment was selected to be of ALLEN WEST manufacture. This was supplied to the order of the main contractors, Messrs. Woodall-Duckham Construction Company Ltd.

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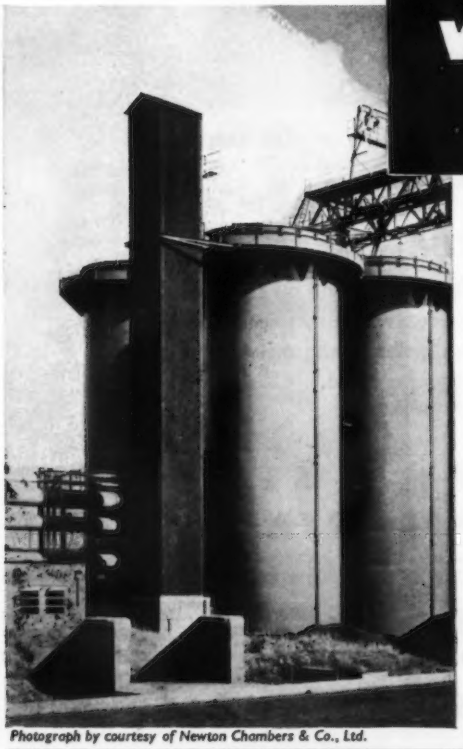
WADSWORTH LIFTS
at AVENUE



Photograph by courtesy of Newton Chambers & Co., Ltd.

Wadsworth Lifts were once again chosen for the new Avenue Coking Site of the National Coal Board, Chesterfield, and were supplied to the order of Messrs. Newton Chambers & Co., Ltd.

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NATIONAL COAL BOARD EAST MIDLANDS DIVISION
AVENUE CARBONISATION & CHEMICAL PLANT
MAIN CONTRACTORS
WOODALL-DUCKHAM CONSTRUCTION COMPANY LTD

'Most completely integrated, and largest of the N.C.B.'s carbonising plants'

AVENUE

THE Avenue coking plant of the East Midlands Division of the National Coal Board at Wiggerworth, near Chesterfield, was opened by Mr. Aubrey Jones, the Minister of Fuel and Power, on October 30. This plant is the most completely integrated and largest of the National Coal Board's carbonising plants, and is probably the largest plant of its kind in Europe.

by our

TECHNICAL EDITOR

The whole scheme was originally conceived by Mr. G. W. J. Bradley, the present Divisional Carbonisation General Manager, and he was responsible for the planning, design and execution of the project. In it, he has realised many of the ideas expressed in numerous papers he has read over the past 25 years about large plant designed to produce vast quantities of open fire domestic coke, and at the same time to generate its own electrical power and to raise its own steam for works purposes, independent of external sources.

Mr. Bradley has been remarkably successful. The planning of the works combines logical placing of plant units, to enable the transfer of all materials including gas to be carried out as easily as possible, with a pleasing arrangement of these units.

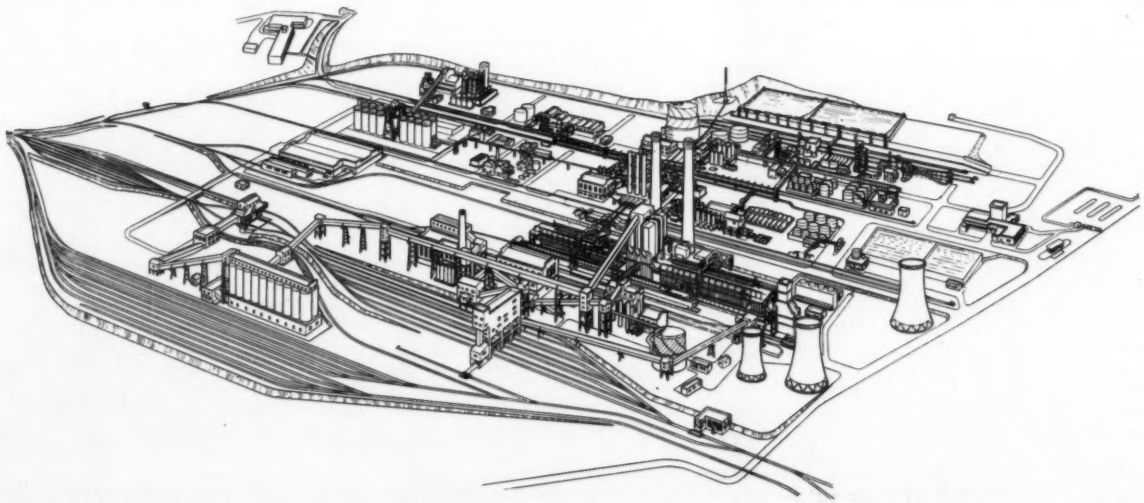
The standard of design of the buildings is up to date, functional and well-proportioned, and the roads and sidings layout caters for the need of access to particular plant units, within the limitations set by the dividing up of the site from east to west into terraces.

It had been planned that there should be a continuous flow of traffic from south to north, as far as possible by gravity. It was decided therefore to have an overall gradient of 1 in 45 in this direction, but it was discovered that the south end of the works lacked about 12 ft. This was overcome by receiving full coal wagons at the coal tipplers down a suitable gradient and elevating the empty wagon a further 12 ft. before setting it on to the siding to be run down to the coke grading section, where it will be filled with sized coke to be despatched by rail.

Originally it was decided that the fullest possible use must be made of any product which appeared as a result of processing the coal in the carbonising plant. It was with this basic fact in mind, it must be emphasised, that the plant has been built. The object behind the planning of this works is the manufacture of coke of a suitable quality for domestic or industrial use. Should the situation in the steel industry demand it the quality of the coke made can be quickly changed to metallurgical coke.

Having made the coke, the by-products including gas (and possibly breeze) must be worked up for sale or internal consumption. If the demand for coke should increase, space has been left for building a second carbonising plant of two batteries of coke ovens and the necessary space and connections have been provided for increasing the by-product recovery plant to deal with the extra products which would result.

At present, one battery of coke ovens



Overall layout of the carbonising plant, ancillary plant and chemical plant, showing terracing. (By courtesy of the Woodall-Duckham Construction Co., Ltd.)

A view of the works at night showing the effectiveness of the flood lighting system. The claim for a minimum of a half foot candle illumination seems fully justified.

has been in production for about eight months and it is hoped to push the first oven of the second battery on November 7. When both batteries are in production a total of 27 mill. cu.ft. per day of gas will be being made, of which 14 mill. cu.ft. per day will be available to the East Midlands Gas Board, the balance being used for underfiring the coke ovens. However, the gas available for the Gas Board may be increased to 18 mill. cu.ft. per day if full use is made of a mechanical producer plant by which 30% of the coke ovens may be underfired by producer gas. The decision to make such a change would be influenced by the economics of the ratio of gas and coke prices.

Total Gasification?

It might even be considered as a possibility that a total gasification plant should be constructed to deal with types of coal mined by the East Midlands Division, which would be unsuitable for use in conventional carbonising plant, and unattractive to the gas industry where the high freights might make the buying and processing of such coal uneconomic. This would be used for underfiring. It is clear, then, that the Carbonisation Division's view is that it possesses carbonaceous material of certain properties. This is fundamentally a chemical raw material, and not necessarily a fuel, and as such it can be upgraded by processing to form as its chief product an excellent fuel, coke. This then is the proper way to deal with our all too scarce fossil fuels and it is conceivable that if the imagination shown by this Division in the past is something to be taken for granted in this and other divisions of the National Coal Board in the future, there seems every chance that the processing of coal on a very large scale will no longer be a dream of an idealist but an accomplished fact.

When the coal industry was nationalised there were in the East Midlands Carbonisation Divisional area, five carbonisation plants, two of which were obsolete (these were Clay Cross and Blackwell) and three, Grassmore, Hardwick and Harworth, though obsolescent, were worth retaining. It was decided to build a completely new plant on a large enough scale for fuel economy and the complete recovery of all by-products, to integrate all power needs, and to make the three plants already in existence satellite plants which would be complimentary to the big central plant.

It was in 1948 that these decisions were made, but it was not until 1952 that the clearance of the site began as there had been some difficulty in deciding on the position. The present site was chosen after 15 others had been inspected. The chief advantages to be gained from this one are, mainly, the availability of suitable coals, its proximity to the A.61 road between Derby and Chesterfield and the 24 in. diameter gas main of the East Midlands Gas Board, as well as its access to the main Sheffield to London railway line. The only disadvantage is that rail traffic cannot be taken out to the main line at the northern end of the works, but must be marshalled in a siding and brought out at the southern end where traffic is entering the works.

Central Control

This difficulty was overcome by controlling all rail traffic from a central control point by short wave radio. This control point is at the main weighbridge office and the traffic controller is in direct contact with the shunting locomotives which are fitted with radio, and all men working on the sidings who are equipped with 'walkie-talkie' sets.

After traffic control comes the centralised production of power and its consumption. The control of power consumption by prime movers on the works is in the hands of the power house superintendent, whose duty it is to keep a balance between the electricity being consumed and the steam available. This is done by having alternative drives to

many of the key machines throughout the works, and it is possible to change from one form of power drive to the other with little delay. The choice of which form of drive to use is decided by the power house superintendent, who can get in touch with another plant superintendent by telephone and can order any change he may think necessary to keep the steam electricity consumption ratio at the predetermined value. A further outstanding feature of the layout of this works is the provision of a maintenance workshop so placed that all types of machines can be brought in for overhaul including locomotives. All oven pushing machinery and the coke car with its locomotive can be brought in direct without being previously dismantled or delayed by complicated handling operations on the spot.

Contractors

The chief contractors for the construction of the Avenue plant were the Woodall-Duckham Construction Co. Ltd., who were responsible for the site preparation, including railways and roads, the coal handling and preparation plant, the carbonising plant, much of the by-product plant, gas holders and gas boosters, the electrical generation plant and water cooling and recirculating plants.

Other contractors who were responsible for major portions of plant construction were Babcock and Wilcox Ltd., who built the breeze turning boilers, Newton Chambers and Co. Ltd. who constructed the gas purifying plant, and Chemical Engineering Wiltons Ltd. who built the continuous tar plant. The National Coal Board themselves were responsible for the layout of road lighting, cable trenches and the choice and purchase of switch gear, motor control equipment, and main cabling.

When the original decision was made to build a large, centralised, fully-integrated plant, the N.C.B. had prepared a draft layout scheme embodying all their ideas of the form such a plant should take, the actual spacing of the plant units, the communications between these units and the communications outside the plant area. When the site was decided upon, it was found that these spacings needed so little altering, and that the dimensions were so nearly suitable for the final layout, that the Woodall-Duckham Construction Co., Ltd., were able to draw up comprehensive over-all layout drawings at a very early stage from which a three dimensional model was constructed. This procedure was of very great assistance to contractors and their sub-contractors who might be taking a comparatively small part in the general scheme. It made it possible for the Woodall-Duckham company to prepare the site as a whole before any other main contractors needed to appear on the scene, thus, of course, avoiding unnecessary delays. Probably this accounts for the excellent progress made in constructing the works, which took a bare four years from the beginning of site clearing to the pushing of the first coke oven.

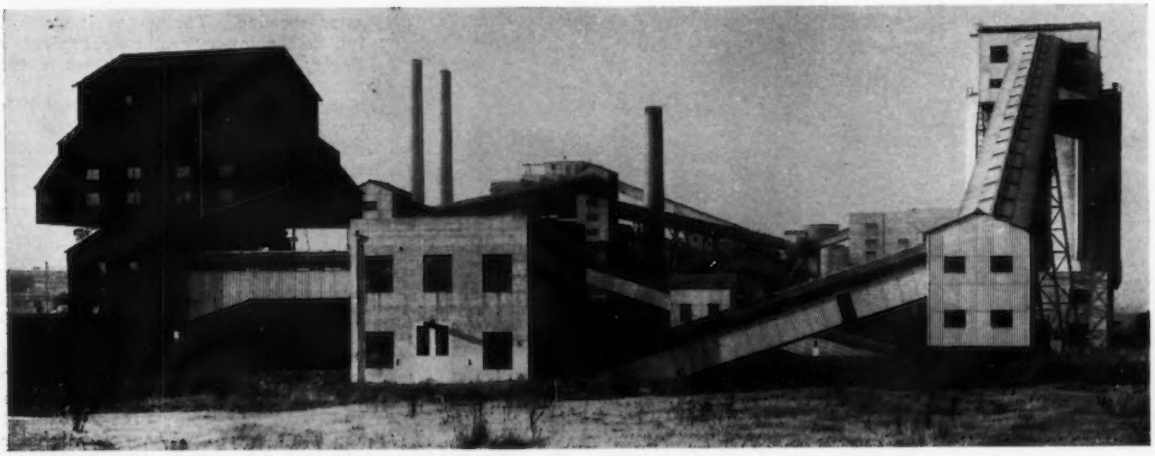
To connect the site to the British Railways main line, it was necessary to lay two railway tracks, one for incoming and one for outgoing traffic, for a distance of about 1½ miles to the south. This involved a good deal of earth moving, and included diverting a stream. At this point a road passed over the main London to Sheffield main line. It was necessary to excavate for a storage siding for wagons being put off from the British Railways sidings further south and to double the length of the road bridge. To connect these N.C.B. sidings with the main works, two rail tracks had to be taken over a flyover bridge crossing the British Railways main line half a mile further north, and connecting with those coming south from the works. This and other civil engineering work in connection with the preparation of the site was carried out by L. Fairclough Ltd. of Adlington, Lancs.

The main site has an area of 188 acres and when chosen was agricultural land sloping, with a steady fall from west to east, with a difference in height over ordnance datum of something between 50 and 70 ft. It was decided therefore to lay out the site in three main terraces at 310, 315, and 320 O.D., which would entail excavating to a maximum depth of 30 ft. and filling to a maximum of about 25 ft., with the arrangement that all yards levels were chosen so that plant units would be situated on excavated sites and sidings would be laid out on filled areas. The terracing of the site involved the excavation and disposal of nearly 1 mill. cu. yards of earth including 30,000 cu. yards of rock. The bulk of the earth removing was carried out by self-propelled wheel-scraper type machines which were specially suited to the long haul conditions of this site. This type of machine gave particularly good compaction of filled areas, as the material is spread in thin layers and rolled in and powdered by following scrapers. In fact, so good was the consolidation that in no case did the settlement of the marshalling sidings exceed 4 in. after three years use by the construction traffic. During excavations, all top soil was moved and stocked separately, and after levelling operations were completed certain areas and all banks were re-soiled and grassed.

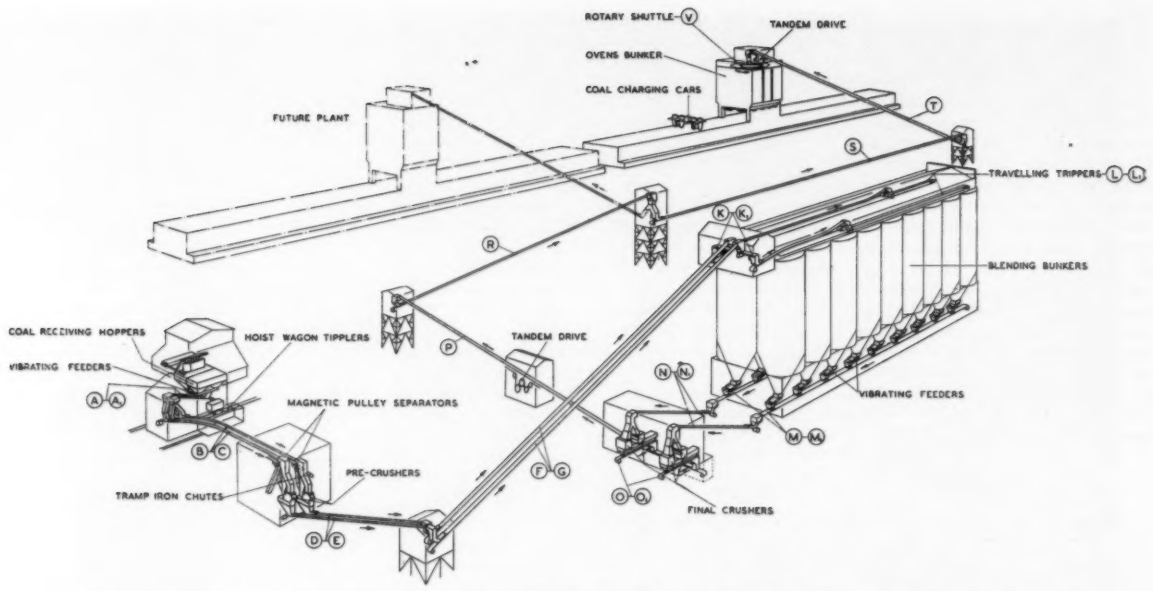
Laying the Track

As mentioned earlier, it was necessary to lay out quite a considerable railway system involving a total length of 12 miles of track. This has been laid out in 95 lb. bull head B.S. section rail, except where the track passed through concrete roadway, in which 80 lb. rail, guarded by 5-in. by 2½-in. bulb angle, was used. All the work of laying this track, involving the use of 90 turnouts, was carried out by Thomas Summerson and Sons Ltd. of Darlington. The railway system involved the provision of two major sidings and two smaller sidings, the connections between the British Railways main line and different items of specialised plant on the works site,

Traffic put off from the British Railways sidings is stored in standing sidings



The coal handling plant showing the tippler on the left and the conveyor system up to the coke oven storage bunker.



Diagrammatic view of the coal handling plant. (By courtesy of the Woodall-Duckham Construction Co., Ltd.)

nearby, which can also hold outgoing traffic, either full or empty waiting to be picked up for despatch. Full trains of coal are brought up to a small storage siding south of the coal tippler by the N.C.B.'s own locomotives which are 6-coupled, diesel-powered, built by Hunslet of Leeds, and fitted with short-wave, two-way radio. From this siding full wagons of coal are dropped down to the coal tippler by gravity. Beyond the tippler is a second small siding on which the empty wagons are dropped into position under the appropriate coke bunker for filling with sized coke. These wagons will then be picked up by the works locomotives and marshalled in the second major marshalling yard on the eastern extremity of the site. Here they will be made up into trains and taken out to the storage siding to be despatched by British Railways. These reception and storage sidings were designed to be used by the heaviest class of locomotives. The earth formation on which these tracks have been laid have been most carefully prepared, and rubble drains have been provided to prevent the underlying clay becoming waterlogged, with consequent settling and a risk of puddled clay working up through the ballasting.

A system of roads also has been built throughout the works, running north and south along the full length of each terrace. Each road is 20 ft. wide and about 1,300 yards long and links up with the two incoming roads at either end of the site and with side roads giving access to various buildings. The roads were constructed during the first year and were available for constructional traffic, whereas the rail tracks were laid as a continuous programme throughout a period of three years.

The roads are finished with a dense tar surfacing to the latest specification. Washed coal is brought into the works by rail from nearby collieries. The type and grading of the coal will vary with its availability and as high a proportion as 40% of the large coal may be used occasionally.

The types of coal entering the coke works are 502, 602 and 702 classes and these will be effectively blended before being charged into the carbonising plant. The full wagons of coal are tipped at a combined tippler and wagon hoist by the Mitchell Engineering Co. Ltd.

There are two tipplers built back to back, in a structure clad with corrugated sheeting. The wagon is weighed full at the lower level by means of a Pooley weighbridge incorporated in the structure and weighed empty at the higher level, 12 ft. above the level it is received at, by a second Pooley weighbridge. The empty wagon is automatically propelled onto the siding at the high level by the raising of the track on which the wagon is standing, and can proceed to the coke screening plant for filling with sized coke for despatch. Each tippler is an automatically-clamped side discharge type and capable of dealing with 30 wagons an hour at a maximum rate of a 20-ton wagon every 90 seconds, or 400 tons per hour. The coal is tipped into two overhead steel hoppers of 40 tons capacity, each proceeding on to a system of belt conveyors capable of handling 200 tons per hour. At the base of each overhead hopper is a double acting reciprocating tray type feeder, cap-

A view of the coal blending bunkers. A comparison with two figures in the foreground emphasises the size of the bunkers.

able of maintaining a flow of 200-300 tons per hour, which controls the delivery of coal on to one of a pair of 42-in. belt conveyors. These conveyors merely serve as a means of feeding either of two 30-in. belt conveyors, which in turn transport the coal to a preliminary crushing plant consisting of a British Jeffrey Diamond 'Flextooth' crusher. Arrangement is made that all coal before reaching the crusher passes near magnetic separators to remove possible tramp iron, and then passes over a screen to enable the slack coal which passes through the screen to bypass the crusher, where the large coal is reduced to 90% through a square-meshed 1-in. screen.

Blending Bunkers

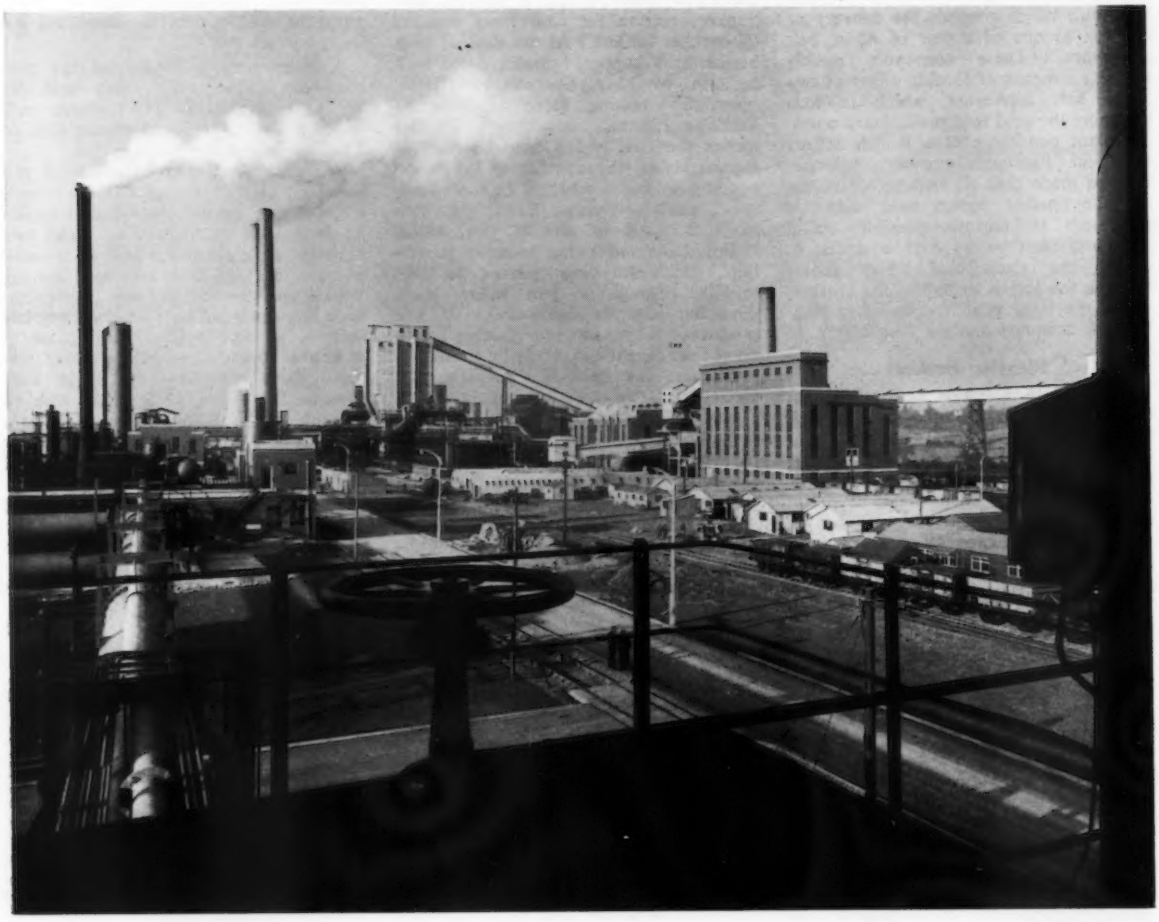
The coal then travels to the blending bunkers, where it is stored until needed. This is a large reinforced concrete building, by Peter Lind and Co. Ltd. consisting of 18 cylindrical compartments, 110 ft. high by 30 ft. in diameter standing on end arranged in two sections of nine with a total capacity of 20,000 tons. Each type of coal will be stored in its particular bunker or bunkers and be withdrawn as needed. Two 30-in. belt conveyors, each serving a line of nine bunkers receive the coal from beneath the bunker feeders. At the base of each bunker is a hoppered outlet, fitted with a 36-in. by 72-in. Sherwen electrically operated vibrating feeder capable of handling 120 tons per hour. By this means the coal is fed onto the belt in regular layers, the number of layers depending on the number of bunkers from which coal is issuing. Each 30-in. belt feeds the coal to one of two British Jeffrey Diamond swing hammer pulverisers, which not only reduces the coal to 80% through an ¼-in. square mesh sieve but also throughly mixes it and produces a reasonably homogeneous blend of constituent coals. From the pulverisers the coal is transported by means of 42-in. belt conveyors on to a series of 36 conveyors to the coal bunker at the carbonising plant. Here it is received by a 48-in. rotary shuttle belt conveyor for distribution to the compartment required.

Each pulveriser has a capacity of 200 tons per hour and the coal handling plant as a whole, a capacity of 400 tons per hour. The carbonising plant storage bunker, which is 150 ft. high, can hold 4,000 tons, including a separate compartment of 800 tons to store coal for test purposes.

A diagrammatic lay-out of the coal conveyor system which was built by W. J. Jenkins Ltd. of Retford, with sheeting by Freeman Morrison Ltd. of Liverpool, is shown on page 358.

The carbonising plant consists of two batteries, each of 53 ovens of the Woodall-Duckham Becker combination underjet system of carbonisation. The two batteries are contiguous and as is usual practice, are fed from one coal storage bunker and two charging cars. Space has been left for building a second complete unit of a similar size, with a means of connection to the coal conveyor system. Each oven is 41 ft. 1½ in. long between the doors, 13 ft. high, with an average width of 16 in. equivalent to a capacity of 657 cu.ft. The two batteries are designed to carbonise 2,175 tons of coal daily, contaning 8 per cent. moisture, to produce 1,400 tons of coke and a total of 27 mill. cu.ft. of gas. The batteries may be fired either by coke oven gas when the underjet system is employed or by producer gas, generated in a mechanical producer plant.

A general view of the coke oven batteries, as seen from the purifiers. On the eastern terrace are the coal preparation and carbonisation plants.



The power house and boiler house can be seen on the right, with the chimney stacks, the benzole scrubbers, and the effluent plant on the left.

The oven brickwork is constructed from first class silica from the pad upwards, except for the regenerator filling, the oven soles, and the walls adjacent to the pinion walls. The oven wall construction is carried out in the well known 'Hammer Head' type of construction, which ensures freedom from leaks and a long life. The regenerator facings are insulated, so are the oven tops which are finished with paving bricks. The regenerator filling is of special design which has superceded the old fashioned 'soaps' and consists of fireclay blocks which give the maximum surface for heat exchange between the brick and the gaseous medium. The feature of the design is a recess at the bottom of each block which forms a series of unobstructed tunnels running from front to back of the regenerator. Such an arrangement enables any dust deposited by the producer gas to be detected and removed by a compressed air lance.

Fuel gas mains and the underjet firing controls are located in a spacious basement running the whole length of the battery and supported on reinforced concrete beams and columns. The pinion wall at either end of the battery is constructed of brick with a steel grillage and is supported independently of the concrete pad, while the battery bracing consists of spring controlled rigid steel members, adjustable to a predetermined pressure. The waste heat flues are of reinforced concrete lined with fire brick, and built along each side of the battery, and at the bunker these flues connect to a central flue leading to centrally located stacks 200 ft. high, 9 ft. internal diameter lined for the first 70 ft. with firebrick, and fitted with Reavell Askania governors.

As has been mentioned above, the underfiring of the coke ovens can be done by producer gas or coke oven gas. When using producer gas, it is necessary to employ a proportion of the regenerators for preheating the fuel gas. Producer gas enters a hot regenerator at either side of the battery, passes up, absorbing heat as it goes and meets preheated air, which has passed through its regenerator. The shape and arrangements of the passages through which the air and producer gas pass and emerge to meet at the base of the flue are streamlined, which causes the burning gas to be distributed uniformly throughout the length of each vertical flue. This ensures equal heating throughout the wall in each direction. The waste gases from the vertical flues are collected in a horizontal flue above, and by means of eight cross-over flues passing over the top of the oven and making a connection to the flues on the other side of the oven, these waste gases pass down these flues, through the regenerator and out to the stack by the waste gas flues. Arrangements are made for changing the sequence of operations every 30 minutes. This change is made automatically and a warning hooter sounds to allow men working on the firing system to stand clear of operating levers etc. The same general heating arrangements also apply when rich gas (coke oven gas) is used for underfiring, but in this case it is no longer necessary to preheat the fuel gas by passing it through a regenerator, and the underjet heating system comes into use.

The fuel gas is taken from the two mains running on either side of the galleries beneath the ovens by transverse connections running under each oven wall. From these are taken vertical connections protruding through gas-tight entrances through ducts into the base of the vertical flues. Here the fuel gas meets preheated air and combustion takes place. The path of the flue gas is identical to that when producer gas is being burnt. The big advantage of this type of arrangement for rich gas firing, is that individual attention can be given to each gas nozzle, and the flow of gas

to each vertical flue can be the more easily adjusted than was the case with the old gas 'cannon' system of rich gas underfiring.

To compensate for the varying width of oven along its length special individually calibrated nipples are incorporated in the fuel gas jets. When producer gas is being used for underfiring, the gas and air nozzles and ports can be adjusted to vary the heat necessary to give a constant flue temperature, throughout the wall. The control and heating arrangements for each battery of 53 ovens are completely independent of each other and an operating room for each battery is provided at the coal bunker end of each battery. In this room is situated the change-over gear, electrically operated and controlled by a master clock with press button emergency switches, with a steam turbine standby, all gauges, governors, etc., each battery working completely independently of the other. The governors for the fuel gas are standard instruments by Reavell-Askania, and recording or indicating gauges are provided for measuring fuel gas pressures, chimney draught, collecting main pressure or vacuum, and waste gas main temperatures.

Coal Charging

Coal charging to the ovens is carried out by a charging car running on rails on top of the oven battery. This car, which is electrically propelled, and supplied by Buchanan and Sons Ltd. of Liverpool, has four steel hoppers, with a capacity of about 16 tons of coal. The hoppers are filled by running it under the coal bunker, and operating the appropriate discharge gates of which there are a total of 20, and allowing coal to discharge into the hoppers. The car is fitted with telescopic discharge spouts which direct the coal into the oven, and operates with an electrical interlock system to prevent the car being moved while charging the oven. Each hopper is fitted with electrically operated vibrating gear and an adjustable measuring device. The coal is weighed before charging by a 60-ton Pooley weighbridge, fitted with a dial indicator and recorder. To recover coal, withdrawn from the ovens by the levelling beam on the pusher machine, a self-landing hoist has been installed at the coal bunker and controlled from a platform above the battery. This is of one ton capacity and returns coal to the charging car. This hoist can also be used for bringing up stores, etc., for maintenance work being carried out on top of the ovens.

Individual Characteristics

The coke is discharged by means of a pusher with the necessary coke guide on the opposite side of the battery for directing the red hot coke into the travelling coke car for conveying it to the quenching tower and from there to the coke bench to await transport to the coke screening plant. Although these operations are modern conventional coke oven practice the machinery installed at this works has many individual characteristics. The first unusual point is that there has been a return to direct current electrical power for all oven operating machinery, including the coal charging car. The reason for this is the influence on its design by the Koppers Company of America, with whom, together with H. Koppers G.m.b.H. of Germany, the Woodall-Duckham Construction Co. Ltd. are in close touch. As a result of a visit to the United States of the Carbonisation Division of the North Eastern Division of the N.C.B., it was decided to incorporate a number of designs new to the United Kingdom. The most outstanding was a new type of self-sealing oven door, which seems to be proving really satisfactory, and provided it is given a minimum amount of maintenance and attention by the operators, it appears to be remaining gastight, and not suffering from a warping of the sealer strip, a common fault on many such doors.

The pusher machine, supplied by Buchanans to the N.C.B. specification, is provided with six individual motors for carrying out its duties, which include travelling, door latching, door lifting, door extraction, coke pushing and coal levelling. Added to this the pusher machine is equipped with a motor driven fan for ventilating the drivers' cabin, for mitigating the working conditions of men cleaning the door fram of an empty oven, and for blowing a stream of air into the top of the oven for decarbonising the oven roof. Should there be a power failure the coke ram can be withdrawn by a lower pressure steam engine and the levelling beam by a hand winch. The whole machine is of very sturdy construction and weighs 130 tons.

There are two machines and a ram and door changing stations are provided at the end of each battery. A door cleaning machine is provided, which is of Koppers (America) design and runs on rails on the pusher side platform. The use of D.C. power facilitates the automatic speed control of the ram, and helps to safeguard the over-running of the oven by the ram head.

The operation of door latching by a motor controlled from the cabin, which is an important feature of the Koppers self sealing door, was worked out for D.C. power, which is more often met with in the U.S.A. than in this country. To save both time and delay, it was decided to adopt the design in its entirety rather than to work out a means for A.C. power.

Electrical Interlock

There is a complete electrical interlock between the pusher machine and the coke guide, so that it is impossible to start pushing coke until both they and the coke car are in position. There are two Greenwood and Batley Electric locomotives for hauling the coke car, which runs on standard gauge railway track, with discharged doors operated by compressed air.

The coke, after quenching, is discharged onto a wharf 320 ft. long, from which it is withdrawn, through regulating gates, onto the steel coke conveyor. This discharges on to a 41-in. belt conveyor for transport to the coke screens.

The coke ovens are equipped with two ascension pipes to each oven and two collecting mains connected by a bridge main, as modern coke oven practice demands, to equalise the pull or pressure on the coal charges. In this bridge main are fitted two 45-in. 'Airscrew' fans to provide recirculation of the raw gas in alternate directions through the collecting mains and ovens with the object of controlling the

The ancillary plant, including benzole scrubbers and rectification plant, on the central terrace.

Interior of the exhauster house, showing steam-driven exhausters and the instrument panel. (By courtesy of the Woodall-Duckham Construction Co., Ltd.)

oven top temperatures. The use of two fans provides circulation in either direction, and for a predetermined time one gas fan recirculates the gas to the pusher side with the other fan idling. The direction of circulation will then be reversed. The reversal is automatic and is controlled by electrical timing gear, providing periods in each direction of from two to six minutes. From the centre of the bridge main is taken the offtake main which is carried over the pusher track in a structural steel bridge, and is connected to the suction main which terminates at the base of the primary cooler. Each ascension pipe is a refractory lined mild steel pipe with a cast iron return bend, fitted with a liquor spray for flushing, a steam connection to prevent smoke and dust on the battery top during charging, and an inspection hole with a cast iron cover. The collecting mains have liquor sprays at each alternative oven, and liquor sealed bleeders one at each end. The offtake main is equipped with Reavell Askania governors, housed in a cabin built on the bridge main over each battery to maintain a constant pressure in the collecting mains. All valves for the liquor mains have been supplied by the Audley Engineering Co., Ltd., and are their lubricated type.

All return flushing liquor and the heavy condensates which accompany it from the pitch trap on the coke side collecting main from each battery are brought down to flushing liquor and separating tanks, where the heavy pitch is extracted continuously by scrapper conveyor before it can settle and become too hard for easy extraction later. The gas proceeds in two streams, one for each battery.

The primary condensers supplied by Whessoe Ltd. of Darlington, are five in number. These are of the 'Multipass' water tube type, arranged to work in parallel, two condensers to each stream, with a common standby.

The condensate is collected separately, that from the hot ends being returned by way of a hot condensate sump to the liquor flushing and separating tank, and that from the cold ends to the cold condensate sump, from which the liquor flows by gravity to the strong ammonia liquor sump and the tar to the hot condensate sump. The gas is passed by the exhausters to the electro detarrers, which consist of four eight feet diameter vertical tube suspended wire electrode type by Whessoe—W.D. Two detarrers are normally in operation on each gas stream, though any three units are capable of handling between them all the gas from both streams. Alternately one unit may be taken off either stream with little loss of efficiency.

The four rectifier transformer sets for working the detarrers are placed in the building underneath the detarrers themselves. From the detarrers the gas passed to the primary naphthalene washers, designed and built by W. C. Holmes and Co. Ltd. of Huddersfield. Each washer has four chambers filled with timber and reed fillings and uses anthracene oil as a washing medium. This oil is supplied by the works tar plant and is treated in an oil regeneration plant, which is also manufactured by W. G. Holmes and Co. Ltd. The secondary condensers are two Whessoe 'Multipass' vertical water tube type, one in each stream. Each condenser has six passes and a water cooling area of 13,000 sq. ft. From here the gas passes to the ammonia washers and the secondary naphthalene washers.

Ammonia Washers

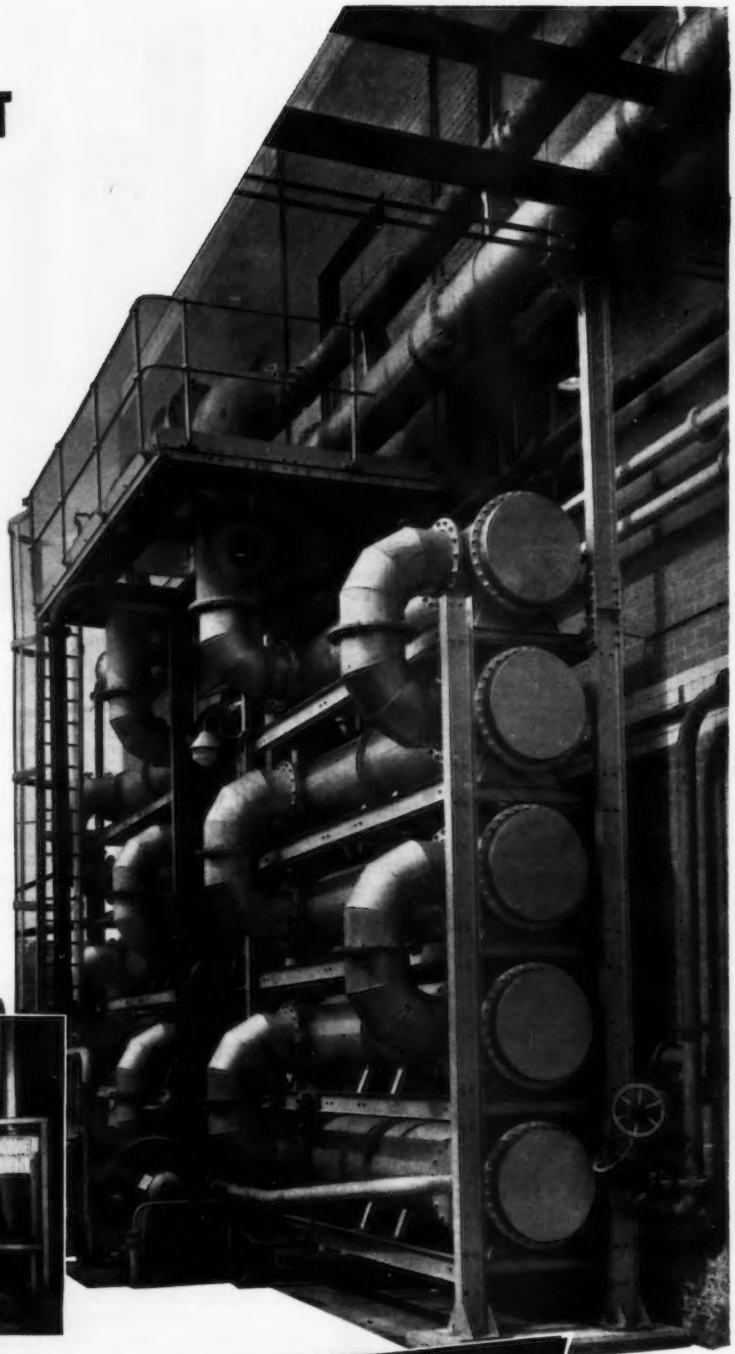
The ammonia washers, also by W. C. Holmes and Co. Ltd. are arranged in a series of three for each gas stream, with provision for by-passing any one of them without detriment to the efficiency of washing, since the remaining units are capable of dealing with the total gas load. Each washer has four washing chambers and is identical in size and type with the primary naphthalene washers. The washing medium is weak 'fixed' liquor bled from the flushing liquor main, and/or condensate from the crude benzole separators, and for final removal of ammonia, a limited quantity of soft water is used. Coolers are provided for reducing the temperatures of the washing media before use. The strong ammonia leaves the washers and gravitates to the strong liquor sump. The gas after the ammonia washers passes through a down flow type water separator to remove entrained moisture, on through the benzole scrubbers, the secondary naphthalene washers, identical to the primary washers, to the dilution

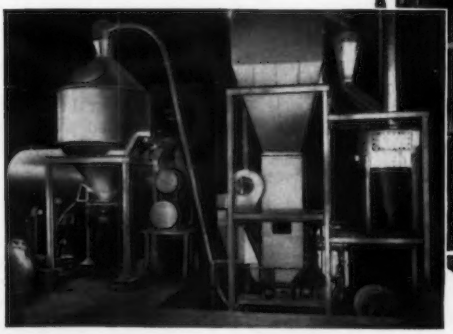
Interior of the compressor house. The Holmes-Connersville meter can be seen on the right. (By courtesy of the Woodall-Duckham Construction Co., Ltd.).

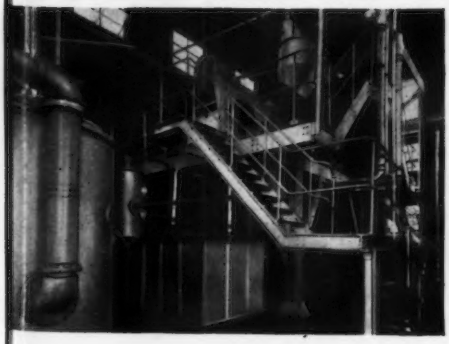
GRADE 1 SULPH. AMM. PLANT AT AVENUE

CAPACITY 35 TONS PER DAY

With the exception of the Stills, the complete plant for producing Grade 1 Sulphate of Ammonia at the new Avenue Works, was designed, built and erected by George Royston & Son Ltd.







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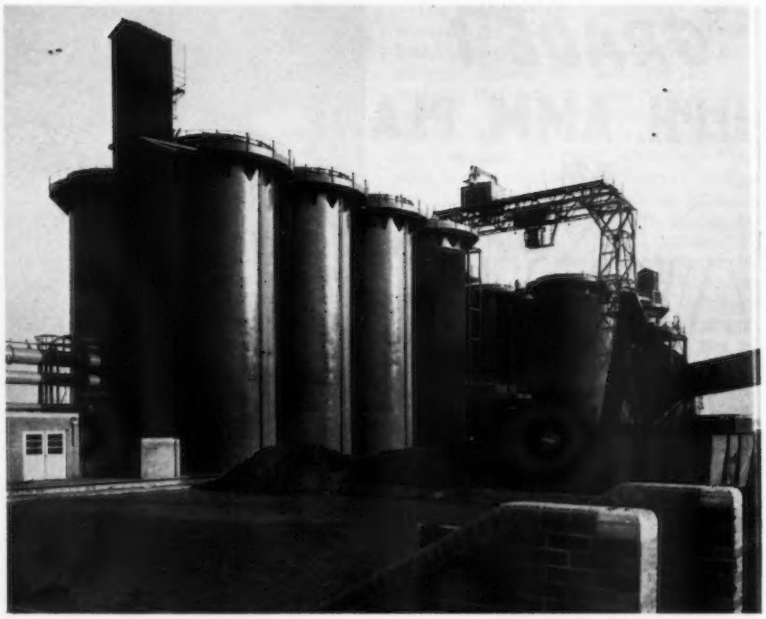
plant, where it is diluted with producer gas from the producer gas plant to the declared value of 480 B.Th.U. per cu.ft. Dilution is carried out by a Kent ratio regulator, a control on the producer gas main, and a Sigma recording calorimeters for both the diluted gas and the coke oven gas before dilution. The diluted gas is passed to the dry purification plant, the purified gasholder and finally after metering to the compressors for distribution to the East Midlands Gas Board's trunk main.

The exhauster house is a brick panelled steel-framed building, with a shallow plate truss roof with asbestos cement, Trafford tiles. The three exhausters which are B.T.H. turbo-exhausters of axial inlet radial flow, are supported on an elevated platform above the gas mains. There is one exhauster for each stream with one standby, each big enough to pass all the gas from one battery and delivering it against a pressure of 2½ lb. per sq. in., though the normal pressure is 1 lb. to 1½ lb. per sq. in. The exhausters are steam driven by direct coupling to stream turbines working at 120 lb. per sq. in. and exhausting against a back pressure of 15 lb. per sq. in. The exhausters are controlled by Askania governors operating through hydraulic steam throttle valves to maintain a constant gas suction. The compressors are housed in a similar building to the exhausters, which also contains the two Holmes Connersville meters, each of a capacity of 10.8 mill. cu.ft. per day, which in an emergency could be increased to 16.2 mill. cu.ft. per day. The two meters operate in parallel. The compressing plant consists of four Waller gas compressors each capable of compressing 6 mill. cu.ft. per day at S.T.P. and delivering at a maximum pressure of 25 lb. per sq. in. These compressors are of the two-crank compound double-acting vertical type, two of which are steam-driven and two are electrically-driven. The electric motors are located in a separate section of the compressor house, and the drive is by V-rope operating a shaft extending through a wall box to the boosters in the main part of the building.

Why Purified Gas?

The purified gas is stored in a 500,000 cu.ft. spirally-guided holder by Newton Chambers, Ltd. From this holder gas is withdrawn by the compressors, but from this holder too gas is fed back to the ovens for under firing. It is most unusual for purified gas to be used for under-firing a coke oven battery, but the Carbonisation Division decided to do so for two reasons. First, it wished to make a contribution to the shortage of sulphuric acid that was prevalent in the country after the war, and, secondly, it was anxious not to add to the atmospheric pollution by discharging relatively large quantities of sulphur dioxide into the air. The extra capital cost of the purifying plant was not considered excessive if both these objectives were achieved.

The benzole plant consists of scrubbers, stripping stills, a once-run plant, and rectification stills, all supplied by the Woodall-Duckham Construction Co., Ltd., and capable of rectifying 20,000 gal. of crude benzole per day. The benzole scrubbers consist of three scrubbers (supplied by Whessoe, Ltd., of Darlington) approximately 106 ft. high working in series. The last scrubber is equipped with an oil separator at the gas outlet. The rich oil passes through a series of heat exchangers, where heat is recovered from crude benzole vapour, and finally heated by two tubular steam heaters. The wash oil still, with a diameter of 7 ft. 4½ in., deals with all the wash oil and has a series of 14 trays at which the crude benzole is removed by intimate contact with steam. The hot oil is cooled and pumped back to the scrubbers. The crude benzole vapour then passes into a continuous still to extract carbon disulphide and the lighter fractions to produce once run benzole for further treatment and final rectification. The carbon disulphide so produced is condensed freed from water and loaded into road tankers from overhead storage tanks.



General view of the tower purifiers, showing the Goliath crane and the stocking tower. The lift is on the left.

The carbon disulphide free benzole, after passing through the once-run still, passes to a water separator and then to storage tanks to await rectification. The residue from the once-run column is passed by a lifter to the heavy naphtha column. Once-run benzole, free from carbon disulphide, is also imported from the satellite works for rectification.

The once-run benzole is washed in two Christie & Grey Typhoon washers, each able to deal with 10,000 gal. at each batch.

For rectification, there is in addition to the continuous benzole and toluole rectification columns, three batch stills, for the distillation of the washed once-run benzole, two with capacities of 12,500 gal. and one still of 8,300 gal.

The continuous still will produce a motor spirit fraction, and a toluole fraction leaving a xylole residue, which can be transferred to the small batch still for rectification to yield pure xylole.

The condensate from the continuous benzole still, after passing through a water separator can be stored or filled direct into road tankers for despatch. The residue can be passed to the toluole section or else sent to the washers by way of a cooler and storage tank, before redistillation. The large batch stills have steel tanks 12 ft. in diameter and about 19 ft. long with two heaters and a column of cast iron 5 ft. in diameter with 30 rectifying trays. The small batch still, generally used for xylole rectification, has a steel tank 10 ft. in diameter, 18 ft. long, and a 4 ft. diameter column with 30 rectifying trays.

Tank Farm

The tank farm (all tanks are by R. & J. Dempster Ltd., of Manchester), to store both intermediate and final products from the benzole plant is in an enclosure surrounded by an 8 ft. wall, forming a sufficiently large enclosed volume to hold the contents of all the tanks. There are three vertical tanks of 50,000 gal. capacity for imported once-run CS_2 free benzole or crude benzole, 16 horizontal tanks of 10,000 gal. capacity by Whessoe Ltd. for storing final products and three 5,000 gal. capacity tanks for intermediate products and residue from batch stills. All the continuous stills are completely automatic and are controlled thermostatically. A very complete instrument panel is provided in the pump house.

An acid regeneration plant is included as part of the benzole plant in which

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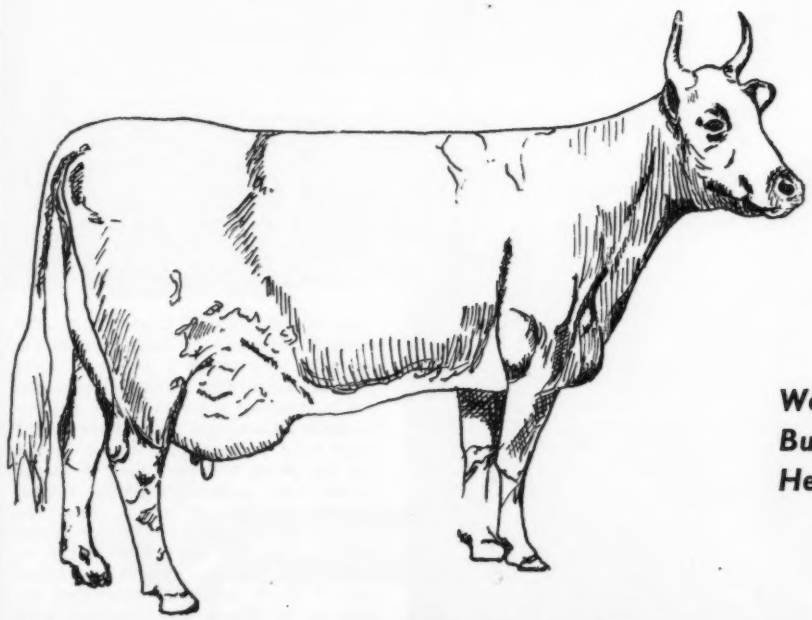

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the acid sludge from the one-run benzole washers is treated with creosote oil and water and agitated with live steam to recover the acid present. This plant is big enough, with a capacity of 5,000 gal., to treat acid washings from one day's treatment of 20,000 gal. of benzole.

Sulphate Production

The sulphate of ammonia plant is a Royston plant with Woodall-Duckham stills and Limbux liming equipment, capable of producing 45 tons of sulphate per day. All liquor recovered in the by-product, purification and effluent plants, together with concentrated liquor imported from outside sources, with a maximum throughput of 7,000 gal. per hour can be dealt with. There is plant storage of 200,000 gal. for liquor recovered locally and a further 20,000 gal. for imported concentrated liquor. There are two ammonia stills which recover both 'free' and 'fixed' ammonia, the two sections operating independently and with a capacity of 4,500 gal. for each still.

The 'Limbux' liming plant receives 'Limbux' lime after it has been weighed on a 'Tollemache' autoweigher of 700 lb. capacity. Here it is converted to milk of lime and pumped to the liming compartment by two open impeller pumps, motor driven, each with a capacity of 1,000 gal. per hour. Two 'Royston' saturators, one standby, receive the ammonia from the stills. These saturators, designed to form a large crystaline salt, are constructed of mild steel, lead lined, and have an additional lining of 3-in. thick acid resisting tiles set in special cement.

Each saturator is equipped with two lead covered copper dischargers, through which the ammonium sulphate is discharged to the crystal separators. Devil gas from the separators passed through heat exchanger units, and a water cooled condenser, before being boosted back to the gas inlet header of the primary condensers by high pressure fans driven by electric motors which form gas blowing units. Two heat exchanger units, one for each saturator, each consisting of five individual units, are divided into two sections. The first section consists of three units forming the heat exchanger, and are built up one above the other in stainless steel. This section preheats the incoming liquor. The second section is built up of two similar units, and water cooled, is the final devil gas condenser.

The oxide burning plant and acid plant, showing the belt conveyors from the purifiers.

The condensates from the heat exchanger units are returned to ammonia liquor storage tanks. From the crystal-separators, which are constructed of stainless steel sheet and equipped with agitator pipes, the ammonium sulphate is taken to the Royston centrifugal driers, also of stainless steel. The 48-in. diameter basket holds between eight and 12 cwt. of sulphate. The 'whizzed' sulphate is charged by way of a stainless steel chute to a Royston flash drier for final conditioning.

The acidity of the sulphate is neutralised by the introduction of concentrated ammonia liquor and steam. Located outside the sulphate house is a hot water tank of 1,000 gal. capacity, indirectly heated, to provide a constant supply of hot water for the various requirements of the plant.

General view of the tar plant. The western terrace.

Severe Regulations

Before the spent liquor from the sulphate plant can be discharged to the sewers or to a stream it must be treated for tar acids and toxic constituents. The regulations governing the passing of trade effluents to local River Board areas have become very severe in the last few years, and even their discharge to the local authorities sewage system is prohibited if the volume is more than ½% that of the dry weather flow of the system. It was decided therefore to install the Corby effluent treatment system which has been developed by Stewarts & Lloyds Ltd. working with the Permutit Co., Ltd., and the Woodall-Duckham Construction Co., Ltd. The effluent to be treated is first allowed to stand and cool. After filtering, the spent liquor is acidified

WHESSOE —

AT AVENUE

For the National Coal Board's new Avenue Carbonisation and Chemical Plant at Chesterfield, Whessoe received an order from the Woodall-Duckham Construction Co. Ltd. for the primary cooling plant (5 vertical water-tube coolers), the secondary cooling plant (2 vertical water-tube coolers), four W.W.-D. electro-detarrers and three benzole scrubbers (each 13′ 6″ in diameter and 106 ft. high). Included in the order were 2 vertical storage tanks (each 34 ft. in diameter) and 14 horizontal storage tanks (each 9 ft. in diameter and 25 ft. long). (Photograph by courtesy of the Woodall-Duckham Construction Co. Ltd.)

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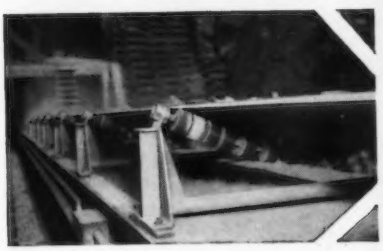
"I MUST ADMIT I WAS SURPRISED BY THIS REPORT"

"Belt wear and the cost of replacing conveyor idlers has always been one of our biggest handling problems, and, naturally, I've always been on the lookout for any new method of increasing the life of both. Coke is one of the most difficult materials to handle, and our normal idlers just weren't standing up to the wear and tear. With this sort of problem I was only too willing to let young Johnson have his head with this new Limberoller idler. When he wanted to let the Joy-Sullivan people install ten of these idlers at one of our trouble spots on the conveyor lines I readily, though in truth a little sceptically, gave the 'O.K.' It was only when he presented his report to me a few days ago that I realised the Limberoller idlers had been working for six months. Obviously, he got a big kick out of that report — and I don't wonder. Just look at this:—"



TYPE OF IDLERS : Limberollers. Designed by Joy in America. Built in Britain by Joy-Sullivan Ltd.

BASIC DESIGN DETAILS : Revolutionary design. Flexible steel cable covered in Neoprene and with Neoprene discs. Uses only two sealed-for-life bearings. (And they really are sealed-for-life).

NUMBER OF IDLERS INSTALLED : Ten.

PLACE OF INSTALLATION : South Bank—a constant trouble-spot.

DATE OF INSTALLATION : 5:3:56

DATE OF INSPECTION AND REPORT : 5:8:56

RATE OF WEAR : No wear as yet. Mould flashings still clearly visible on discs.

CARRYING QUALITIES : Excellent. Limberoller Idlers shape themselves to the load carried. Spillage reduced.

INSTALLATION DIFFICULTIES : None at all. They are far lighter and more easily installed, knocked down and moved.

MAINTENANCE PROBLEMS : Again, none at all.

SPACING ON BELT : Very economical. Each idler supports more belt than any conventional type. We are using 5' spacing.

RELATIVE WEIGHT : Complete Limberollers weigh as little as one-third of the weight of our existing idler sets.

RELATIVE COST : Very competitive. Neoprene is a must for the really tough jobs, but with less idlers per belt cost is kept down. Rubber Limberollers would be ideal for easier conditions such as the Victoria Works, and naturally cost less.

R. W. Johnson

R. W. Johnson.

"Well, there you have it, gentlemen. For about fifty pounds we have tested these Limberollers and the potential savings revealed more than justify the experiment. Just think what we could do if we standardised our entire conveying system with Limberollers."

Just think what you *could do. Why not contact Joy-Sullivan now and try the ten Limberoller test yourself.*

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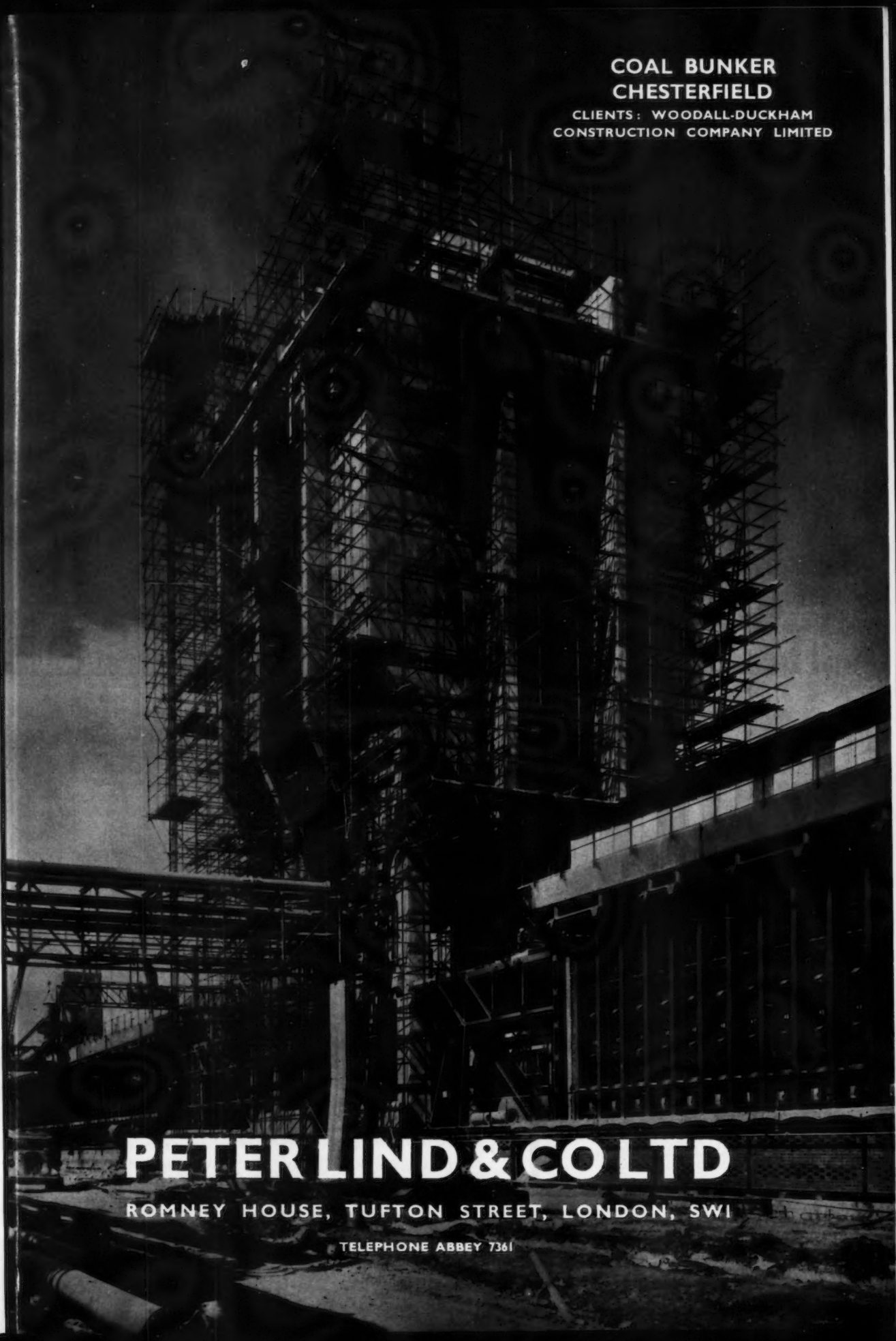
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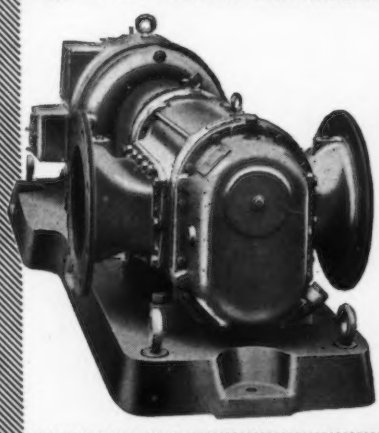

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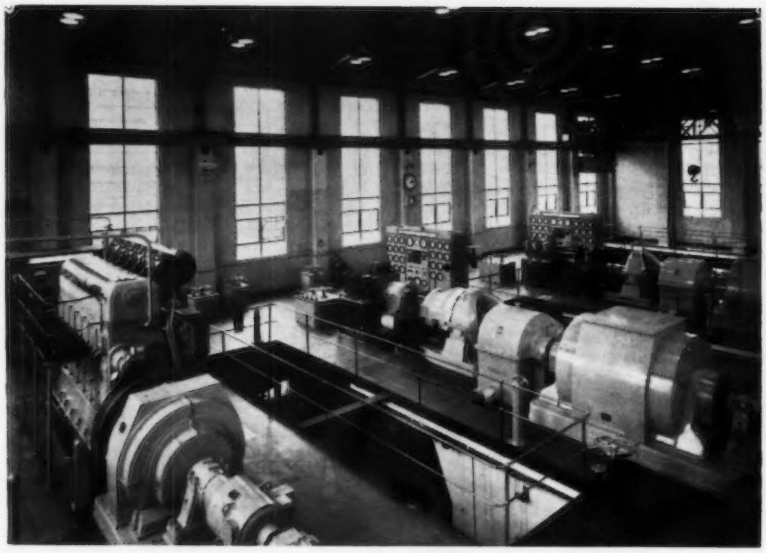


Interior of the power house, showing diesel-driven alternators on the left with two turbo-driven sets on the right. (By courtesy of the Woodall-Duckham Construction Co., Ltd.).

with hydrochloric acid to lower the *p*H value to a suitable degree for the ion exchange treatment which follows. Here an ion exchange reagent known as De-Acidite is added which frees the liquor of thiocyanates, and thiosulphates. This reagent is regenerated by flushing with ammonia solution. The resulting liquor is concentrated and pumped into a battery of carbon filters which absorb the tar acids and higher phenols. The liquor is finally treated with lime and discharged as a colourless innocuous solution to the works drainage system. The carbon fitters are cleaned of their absorbed tar acids by flushing with benzole, which with the tar acids is recovered at the tar plant. The ammonia used for regenerating the De-Acidite is recovered in a small still and as much hydrochloric acid as possible is also recovered. The efficiency of treatment may be gathered when it is realised that the oxygen absorption factor has been reduced from 4,000 ppm. to less than 70 ppm. and the thiocyanate concentration from 230 ppm. to .40 ppm.

Gas Purification

The gas purification plant has been supplied, designed and constructed by Newton Chambers & Co. Ltd. of Thorncliffe, Sheffield. It is of the tower type, in accordance with the most modern practice, and consists of two sets of six welded steel working towers each 22 ft. 4 in. in diameter by 65 ft. high (a stocking tower of the same dimensions and a stocking frame), working in parallel, each set being able to deal with half the amount of gas being made, up to a total of 26 mill. cu.ft. The towers are mounted on a reinforced concrete foundation, which includes space for spent and fresh oxide. This has been constructed by Peter Lind & Co., Ltd., to the designs of F.C. Construction Co., Ltd. Each tower contains 15 containers, each of which holds 25 tons of oxide, in two layers supported on wooden grids. The gas to be purified is brought to the purifiers by a 36-in. main which divides into two 30-in. mains connecting each set of towers, and enters at the base, passes up the middle of the tower through the layers of oxide and leaves the tower through the outlet located about half way up the outer shell. Valves are provided for isolating a tower or for altering the sequence of gas travel between the towers. Two platforms are provided, one at about 3 ft. 6 in. below the top, reached by a Wadsworth lift (or a stairway) from which access may be gained for taking off the lids, and a second platform lower down to allow easy access to the gas valves.

Skeleton Tower

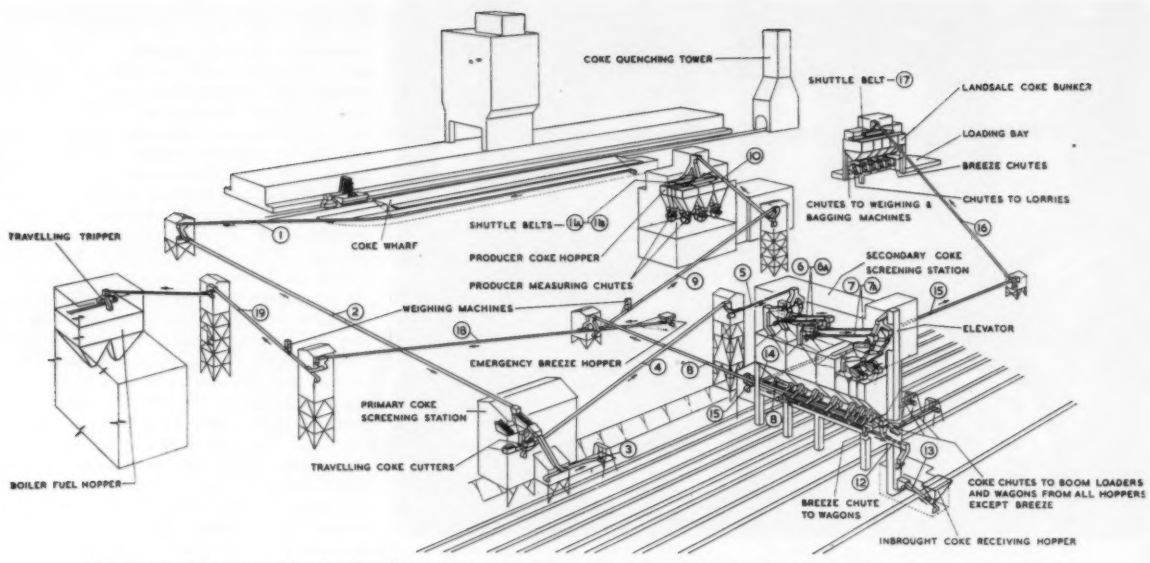
The main towers are welded steel from which the trays containing spent oxide are taken out by a Goliath crane supplied by Sir William Arrol Ltd., and can be placed in the stocking tower. This is only a skeleton tower, the sides of which are covered in by special corrugated sheeting supplied by Robertson Thane Ltd., of Ellesmere Port. The trays containing fresh oxide are taken from the stocking frame and placed in the tower. The tower will be closed, purged and the gas admitted. As time allows, the spent oxide will be taken out of the frames, and will be either transported by reversable conveyor to the acid plant, sent away by rail, or if partly spent, be prepared for re-use. The handling plant is by W. J. Jenkins Ltd., of Retford.

After a good deal of experiment an acid plant has been designed which really meets the needs of a works the size of the Avenue plant, that is to say, for a plant which produces enough oxide to make the provision of an oxide burning plant economically worth while. The plant, a Kachkaroff acid plant designed by Chemical Plant & Sulphur Extraction Co. Ltd., and supplied by Simon-Carves Ltd., of Stockport, has somewhat unusual features. These are, that the spent oxide is burnt at a sufficiently low temperature that it is in no way rendered inactive for further use in the purifiers, and that the space taken up by the reaction towers is unusually small. At one time it was necessary to have exceedingly large lead chambers for the reaction between sulphur dioxide, oxygen and steam in the presence of nitrous oxide. This has now been reduced to 1½ cu.ft. of reaction space per lb. of sulphur recovered every 24 hours. There is one such acid plant now working in Great Britain, at the Phœnix Wharf plant of the South Eastern Gas Board, but this plant uses Morris furnaces for oxide burning, whereas the Avenue plant uses Flixborough rotary burners. The use of these burners makes the plant unique in this country. The spent oxide is fed to the burners from overhead bunkers through a speed controlled table feeder to a chute and is allowed to drop into the outer shell of the burner. Ignition takes place immediately and oxide and cinder pass down the rotary cylindrical furnaces to the discharge end. When cold this is mechanically blended with peat and sawdust and returned to the purifiers.

The furnace gases from the oxide burners, containing 5-6% of sulphur dioxide, enter the acid plant. The basis of the process is the reaction under controlled conditions between sulphur dioxide, oxygen and nitrous vitriol (sulphuric acid containing oxides of nitrogen), when the oxidation of the sulphur dioxide to trioxide takes place with the almost simultaneous regeneration of nitrous vitriol. This reaction takes place in the reaction towers. Acid is bled off to the denitration tower, equal in quantity to the acid made, and recirculated in a closed cycle. After partial denitration the acid leaves this section and is passed to a second section where denitration is complete. The temperature of furnace gases entering the concentration tower where the acid is concentrated to a strength proportional to the volume in circulation, is 500°C. and the temperature at which they leave is 80°C.

Degree of Nitrosity

To maintain the degree of nitrosity of the nitrous vitriol, oxides of nitrogen are generated by means of the oxidation of ammonia over red hot platinum, and introduced to the reaction tower. The ammonia oxidation plant is only worked intermittently to make up losses in oxides of nitrogen that may get carried forward. Because of the high nitrosities and the varying acid concentrations, the choice of materials for construction of the plant had to be very carefully considered. The comparatively low temperatures throughout the plant have made it possible to use P.V.C. materials for pipework, tanks, and tower sheathings. This has reduced the danger from corrosion and maintenance costs. Temperature limitations have compelled the use of lead for the concentration and



Diagrammatic layout of coke handling plant (By courtesy of the Woodall-Duckham Construction Co., Ltd.).

Glover towers, but the reaction tower is made of cast iron. Because of the higher temperature in the denitration tower, this has had to be made of masonry.

A control room is situated under the reaction tower staging where a comprehensive instrument panel is to be found. Here are temperature recorders, flow meters for gas and acid lines, *p*H alarms, etc., which enable the operator to control the plant by taking samples for specific gravity and nitrosity determinations, and make the necessary adjustments. All the interior painting of this plant has been carried out by Manor Decorators, Ltd., of Nottingham. William Wadsworth, Ltd., of Bolton, have supplied a goods and passenger lift, and reinforced concrete work was by W. J. Whittle & Sons, Ltd.

Continuous Tar Plant

The tar plant, supplied by Chemical Engineering Wiltons, Ltd., is a continuous plant with an eventual capacity of 400 tons per 24 hours. It comprises eight main units:

1. 'Wilton' tar distillation unit, where tar is distilled in a continuous pipe still and fractionally condensed to form benzole, solvent naphtha, carbolic oil, naphthalene oil, creosote, and anthracene oil.
2. Tar acid extraction plant. Here tar acids are continuously extracted from carbolic and naphthalene oil by caustic soda, followed by treatment with carbon dioxide to regenerate the caustic soda. The CO_2 is generated in a boiler plant.
3. Tar bases extraction plant. Here bases, principally pyridine, are extracted by washing distillation oils with diluted acid and subsequent treatment with ammonia.
4. Naphthalene unit. Naphthalene oil is treated to produce a naphthalene in the form of liquid or a flake of melting point 76°C. This is principally used as a source of raw material for phthalic anhydride manufacture.
5. Anthracene extraction unit. The anthracene oil from the distillation unit is allowed to crystallise, the oil drained off, and the residue centrifuged.
6. Blending unit. In this section, pitch creosote blends are made, and road tars or fuel oils of various specifications are manufactured.
7. Pitch production. Pitch of various qualities can be made, and its storage is regulated by market conditions. When this is adverse, a plate conveyor is available whereby the pitch can be cooled in thin plates, which are easily broken up and returned to the carbonising plant.
8. Bulk storage is provided for crude tar, pitch creosote blends, road tar, creosotes, tar acids, tar bases and various drained oils.

The plant is well equipped with heat exchangers and adequately instrumented. The construction of the plant was carried out by Chemical Engineering Wiltons, Ltd., who employed W. J. Whittal as subcontractors for all excavating, concreting and brickwork.

Steam for Power

All steam for power generation is raised in Babcock C.T.M. type boilers burning breeze. There are three such boilers installed, each rated at 60,000 lb. of steam per hour at 465 lb. per sq. in. superheated to 640°F., when fired with coke breeze of a net C.V. of 9,200 B.Th.U. per lb., a moisture content of 22% and an ash content of 11%. These boilers are the biggest of their kind in the United Kingdom. To ensure that the breeze is successfully burned, a form of recirculation of flue gas is practised, whereby a fan provides a slight suction at the front end of the stoker, which draws warm gases from the furnace on to the fuel entering the furnace. On these boilers, with a grate, 21 ft. wide and 18 ft. long, there are two such fans, one on either side of the grate. Fuel is brought in by belt conveyor from the coke grading plant, and ash is extracted by paddle extractors and is quenched before being taken away by belt conveyor to a receiving hopper outside the boiler house. Steam passes to the power house in an adjacent building, where it drives two turbines by W. H. Allen, Sons & Co., Ltd., directly coupled through reduction gear to alternators by English Electric Co., Ltd. These turbines, which are pass-out and condensing, are each designed for a power generation of 5,000 kW with steam at 450 lb. per sq. in., superheated to 625°F. passing out 95,000 lb. of steam per hour at 120-130 lb. per sq. in. They are fitted with condensers suitable for 40,000 lb. of steam per hour at 28 in. Hg. vacuum, allowing 3,000 kW. to be generated without pass-out.

Thus pass-out steam is used on prime movers throughout the works, which in turn exhaust at 15 lb. per sq. in. to supply process steam. Each alternator, the windings of which are impregnated against attack by fumes, is wound for a 3,300 v., 50 cycles, 3-phase supply. The high pressure and low pressure steam mains are laid out in the form of a ring main, so that by manipulating valves, neither power supply nor steam supply need be interrupted during maintenance work. Should there be a breakdown of both turbines, a 500 kW. diesel generator is installed which will start up automatically. The pass-out steam undergoes desuperheating by a pressure reducing valve and desuperheater by James Gordon & Co., which maintains a degree of superheat, at 50°F., in the low pressure system.

Power is distributed from the power house in three separate systems, (1) 3,300 v. A.C., (2) 415 v. A.C., and (3) 220 v. D.C. All the 3,300 v. main generation and distribution switchgear has been sup-

plied by Allen West & Co., Ltd. This includes main switchgear throughout the plant. The D.C. supply, used only on the coke oven batteries, is obtained from two English Electric rectifier units rated at 300 kW.

The supply of feeder cables was by Barrs (Sheffield), Ltd., while W. H. Smith & Sons (Electrical), Ltd., and W. J. Furse, Ltd., of Nottingham, were responsible for a number of electrical installations throughout the works, where they acted as sub-contractors. The cooling tower for condenser water is by K. Holst & Co., Ltd., Leeds, and all cable ducts were constructed by H. Camm & Co., Wiggerworth.

Coke Handling

The coke handling plant was constructed by the Woodall-Duckham Construction Co., with W. J. Jenkins Ltd. in charge of the belt conveyor system. The coke is transported by a 42-in. belt conveyor to the primary screening plant, where coke over 2½ in. is separated by two Gyrex screens (one standby) each of 120 tons per hour capacity. The oversize is delivered by chute to a 42 in. boom loader for filling rail wagons, or it can be passed to either of two Phœnix P.S.C. coke cutters. Both the Gyrex screens and the cutters are mounted on carriages and can be readily moved out of line.

From here coke, either under size from the screen or from the cutter, is transferred by 42 in. belt conveyor to the secondary screening plant, where it is divided into two streams, each with a capacity of 60 tons per hour, and each with five single deck vibrating screens operating in sequence.

The first three are Gyrex, giving the following sizes, 1½ in. ⅞ in. and ⅝ in. the oversize passing down chutes to its respective storage bunker. The last two screens are electro-magnetically operated Sherwen screens separating at ⅜ in. and $\frac{3}{16}$ in. respectively, with the screening surfaces gas heated to avoid clogging.

The storage hoppers have a total capacity of 500 tons, varying between 150 tons each for 2½ to ⅞ respectively, 100, 50 and 25 tons for other sizes. Railway wagons can be directly filled, but conveyors provide transport to the producer plant, boiler plant, or the land sales bunker respectively. From the land sales bunker road transport can be filled with all sizes of coke including breeze, though under present conditions breeze is being imported from the satellite works as boiler fuel.

The producer gas plant consists of six Woodall-Duckham Koppers mechanical producers, housed together with their fuel hoppers, in a brick building. These producers, with an internal diameter of 8 ft. 6 in. are each equipped with an annular boiler, raising steam at 15 lb. per sq. in., a revolving feed arrangement and a revolving grate.

Relief of Holder

Four producers are normally in use with two standby, with provision for extension if needed, and will generate sufficient producer gas for firing one-third of the ovens and sufficient diluent gas. Combined air blowers and exhausters by Keith Blackman, provide air under pressure and boost the gas into a relief holder. This is a single lift spirally guided holder of 100,000 cu.ft. capacity by Newton Chambers. From here the gas is drawn out as it is needed.

Throughout this works there is the constant reminder of the most meticulous planning to ensure that the utmost efficiency is being applied to production at every point combined with great flexibility.

Gas in France

Coke Ovens at Grand-Quevilly

TO climax their 73rd Summer meeting the Association Technique de l'Industrie du Gaz en France visited the coke-oven plant at Grand-Quevilly, about four miles down the Siene from Rouen. The works covers an area of 64 acres. It can carbonise 800 tonnes of coal per day. Its maximum daily production is 350,000m³ (12,360,000 cu.ft.) of gas, 600 tonnes of coke, 25 to 30 tonnes of tar, 7 to 8 tonnes of sulphate, 6 to 8 tonnes of benzole. It receives coal both by river and rail.

The ovens are in two batteries of 21 and 15 ovens of the Becker system. The first was constructed of materials received from the ovens at Trignac. The second was built by 'Disticoke' of the Underjet type. Each oven has a capacity of 17 tonnes of coal, carbonising 22 tonnes per 24 hours.

Heating can be effected either by coal-gas or producer gas supplied by three Heurtey generators fed either by coal or by coke. Coke discharged from the ovens is dry-cooled, remaining 1½ hours in the cooling chambers. At maximum capacity, the sensible heat of the coke produces 340 kg. of steam at about 15 atmos. and 300°C. per tonne of coke cooled. Wet quenching is provided for as a standby.

Primary cooling is effected in vertical water tube condensers; sulphate is made by the semi-direct process after which final cooling is effected by atomised water in which naphthalene is thrown down. Benzole is recovered in anthracene oil washers, the oil being regenerated by an electro-filter. The calorific value of the gas is automatically adjusted by the addition of producer gas. Dry purification is effected in 16 towers arranged in groups of four, each 4.8 m. dia. with eight containers with two layers. Oil from the washers is debenzolised by vacuum.

Administrative and social services include extensive dressing rooms with collective washing and individual shower bath facilities, as well as a refectory for workmen and staff, and medical service with radioscope. For the housing of personnel, a block of 104 flats has been built on the hill behind the works.

Refractories

The August issue of the *Journal des Usines à Gaz* contains a full-length study by M. H. Blanc, Chief Production Engineer to Gaz de France, on the expansion of refractory materials in the construction and operation of carbonising plant. It is well worth perusal in full. The paper is in three sections of which the first two contain the usual data relating to silica and silico-aluminous refractories and their constituents, illustrated by numerous curves of expansion and contraction of a wide range of refractories in use. The third part (here abstracted) gives conclusions drawn from these data.

For each variety of material it is possible to determine the theoretical curve of heating-up plotted against time which will give a straight line curve of expansion in the course of kilning. In the factory at Landy these theoretical curves have served as a directive in the operations of kiln firing with a resulting significant reduction in damage goods.

In the construction of carbonising retorts and setting, the refractory materials must remain stable; that is to say, they must show very little permanent linear expansion at working temperatures—they must exhibit very small after-expansion or after-contraction. For silica bricks after heating at 1,500°C. for two hours and cooling, after-expansion should be less than 0.5%. For silico-alumina (fire-clay) bricks, after heating at 1,400°, 1,300°, or 1,200° (according to quality) for one hour, the after-contraction should be less than 1%.

During the drying and heating-up of a setting, it is necessary that the brickwork should be able to expand freely without risk of distortion; expansion joints should be arranged in the construction; an approximate allowance is 1.4% for silica, 0.7% for silico-alumina. Expansion joints should be filled with material plastic at low temperatures, such as corrugated paper, pitch, straw, because, in silica materials particularly, expansion is nearly finished at 500°C. Mixed constructions must be specially studied to allow for the relative expansions of the two materials.

A curve of heating shows that to maintain a straight-line expansion in drying and heating-up, a silica continous vertical retort setting temperatures should rise steadily to 500°C. in 50 days, while the rise should be accelerated to 800°C. in a little over 70 days. The change to gaseous firing should take place in about 66 days at 700°C., and retorts may be charged at 900°C. in about 71 days.

The difference between the volume of gas sent out in winter and in summer becomes greater every year—in the Paris region the ratio between the two now reaches 4 to 1. In spite of the use of peak load plant it is necessary to vary considerably the output of coal gas. With retort settings these variations have been made by modifying the operation of the plant, or by reducing the output, or by standing down sections of plant. As long as, in modifying the operation of plant,

the temperatures of silica are not reduced below the critical figure of 500° to 600°C. no difficulty has been experienced In reducing the temperatures to slow down or to stand off plant it is necessary to follow the same curves in cooling (and then re-heating) as in the heating-up of settings.

It should be mentioned that in cooling down the contraction is less regular and less in magnitude than the expansion of heating-up because a certain number of joints will open and remain partly open when the work is cold; it is however advisable to follow the curve of heating in the inverse and not to modify it if the contraction does not appear to follow a straight line curve.

Coke ovens have generally been kept working at a constant rate; variations have been taken up by retort plant. But as coke ovens come to be preponderant in total production they also must become, in the near future, subject to variations in rate of working, to obtain modulation in the output not only of gas but of coke. So far these variations have been effected by change of firing from rich gas to producer gas, giving modulation in gas output. But if output of coke is also to be considerably varied, it will become necessary to alter the operation (as for instance, by varying the period of carbonisation). These methods are now being studied in the Paris region.

From a Paper presented to the Eastern Junior Gas Association on October 25.

The Story of Gas in Ceylon

D. WILLIAMSZ and M. VAN CUYLENBERG,

TRAINEE ASSISTANT WORKS SUPERINTENDENT AND TRAINEE ASSISTANT DISTRIBUTION ENGINEER, COLOMBO GAS AND WATER COMPANY, LIMITED.

THE Colombo Gas and Water Company Limited is a company registered in Great Britain and operating as a gas company only (its power as a water company has never been exercised) in the town of Colombo and the adjoining urban districts. Authority for supplying gas was granted by a Ceylon Government Ordinance in 1869 and, by an indenture in the same year, the Colombo Municipal Council made covenants with the Company in relation to the supply of gas within its area and also assisted the Company in obtaining a site for the works in the centre of the town. The site was described as a 'slushy bog' and was one which had been rejected as impossible for the building of a police barracks and a public market.

The works were practically completed by September, 1871, and the town was gas-lit for the first time on August 10, 1872. The works still occupy the same site, but the surroundings have become very congested with shops, offices and Government departments. As sales increased further, a district holder was erected in the southern section of the city. A carburetted water gas plant was installed in 1946 to supplement the horizontal retorts. This was the original method of carbonisation and remains so to this day. Various sources have been drawn on for our coal supplies—the earliest shipments being from England and Australia; Japan, too, at one time supplied us with coal—but now, and for many years past, Indian coal has been used exclusively.

At the works, the coal is unloaded on to a hopper, feeding into a crusher below ground level and then elevated to retort-house storage hoppers by bucket elevator. It is carbonised in horizontal retorts and the daily consumption is about 45 tons —giving an output of about three-quarters of a million of 400 C.V. gas—dilution being effected with producer gas or blue-water gas. The retort house was designed and built originally by Gibbons Bros., and re-designed and re-built by them again in 1926. It consists of 12 settings—six of which are in use at the moment—each setting containing eight retorts of D-type shape—22 in. by 16 in. by 22 ft. Each half of the house consists of six settings, each having a stack for disposal of flue gases. No waste heat recovery from flue gases is practised at all. The settings are the usual step-grate regenerative type—gas off-takes are the old ascension pipes with hydraulic seals and tar towers.

The retorts are charged and discharged with the Guest Gibbons machine—the hot coke is discharged on to the retort house floor, where it is quenched by hand and shovelled out of the retort-house on to the yard. This practice has not benefited by mechanisation—for the simple reason that labour is cheap and it would not be economical to set up handling plant, coke hoppers and coke screens. A gang of native labourers sack the cooled, quenched coke, accumulated and dried through the night, ready for despatch. The works boasts of two Lancashire boilers, which are used alternately to give steam at a pressure of 75 lb. per sq. in. Steam is used only for operating the Waller-type bladed exhauster, and liquor and tar pumps, and for operating the rotary scrubbers.

Coke finds a ready market in the hill-country of Ceylon, where elevations go up to 6,500 ft. above sea-level. The climate is much colder there and the houses require fires and boilers. Coke also finds many applications in the city, from domestic cookers to industrial use.

Benzole extraction and liquor concentration are not practised as no chemical works will handle small quantities such as would be obtained from our works. Spent oxide is also disposed of, when the maximum possible use has been made of it, again for the same reason. A dri-gas plant, though now absent, would be most useful and is being considered for installation. The only other by-product, apart from coke, which finds a ready market is tar.

The works also has an automatically-operated, hand-clinkered Humphreys and Glasgow carburetted water-gas plant, rated at approximately 1 mill. cu.ft. per day. This plant is used mainly to ease the coke situation and to save storage space. Gas is delivered at a declared value of 400 B.Th.U.

We have about 155 miles of main, ranging from 3 in. to 15 in., of which 4½ miles are of 6-in. steel, the remainder being cast-iron. Our greatest trouble with mains is condensation, due to the very warm soil being quickly cooled by torrential showers of rain.

Much has been done in recent years to keep abreast of the times with new appliances, but the fact that more than half our 4,000 consumers are served through the old-type wet meter would appear old-fashioned. But experience has shown that the drying out of meter leathers due to the high atmospheric temperature was, and still is, a deciding factor against replacement.

In former times of expansion, price, utility, popularity, and service were equal selling points, but today, with keen competition from electricity and oil selling at about half the price of gas, service in all its forms is only a means of maintaining and increasing our domestic load. Electricity, with the development of the hydro-electric scheme, is growing in popularity, but our greatest competition at the moment is kerosene. Our annual consumption of gas now amounts to about 237 mill. cu.ft. We have two well-equipped and ideally situated showrooms, and our lady canvassers combine their job with that of after-sales service.

After the second world war, it was thought that the country would industrialise, and every endeavour was made to push gas into the industrial field—with little success—chiefly due to the fact that many of the ventures started were too small and had no stability. The 'large consumer' load, however, is not dead, as 34 mill. cu.ft. of gas were accounted for in 1955 by consumers using over 50,000 cu.ft. per month.

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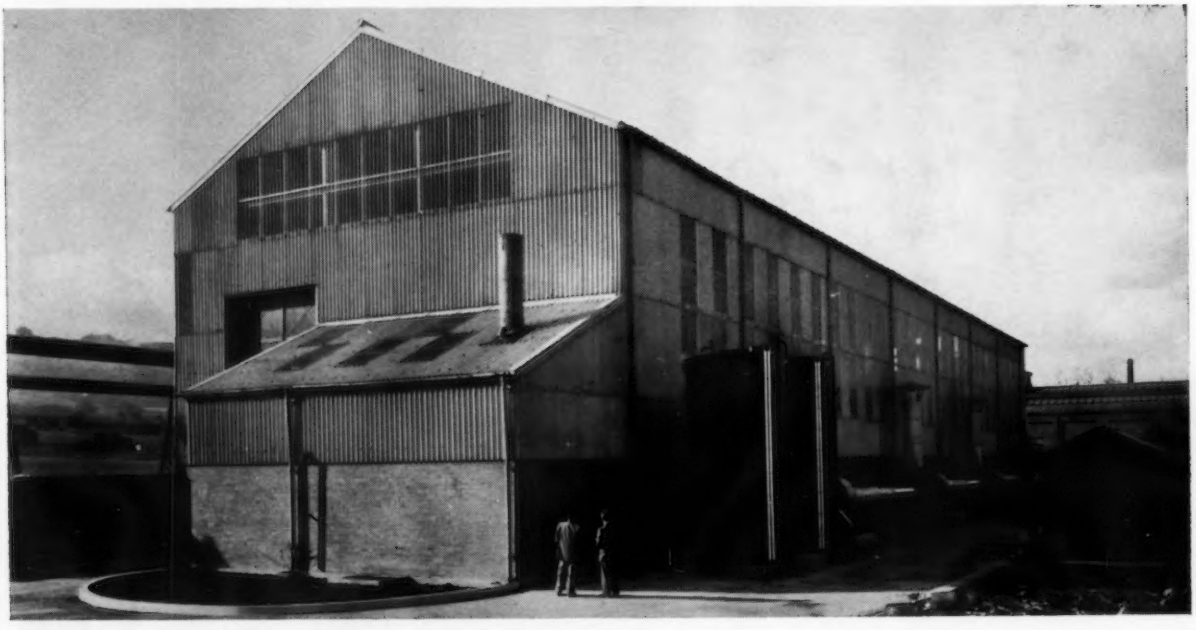

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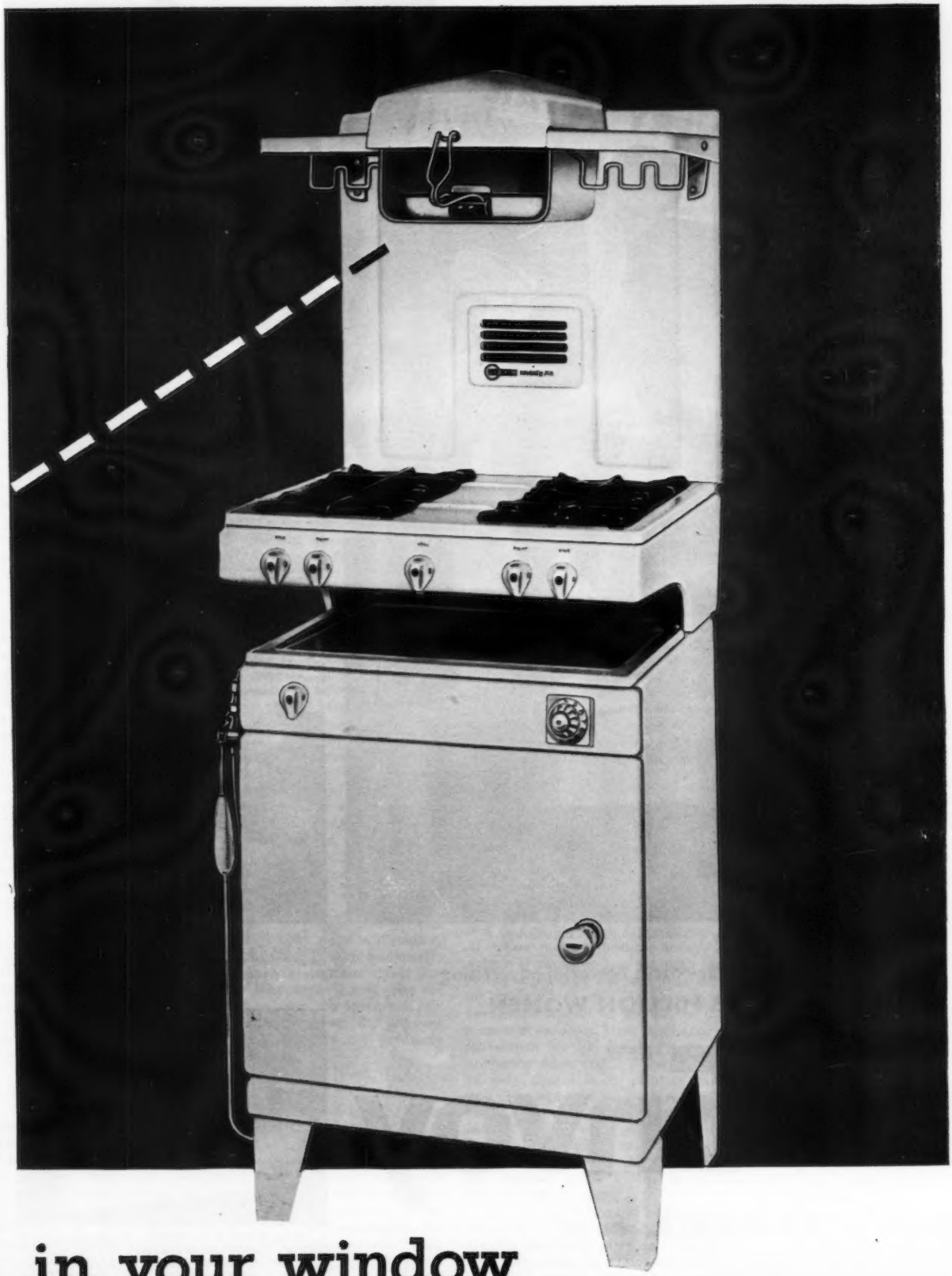

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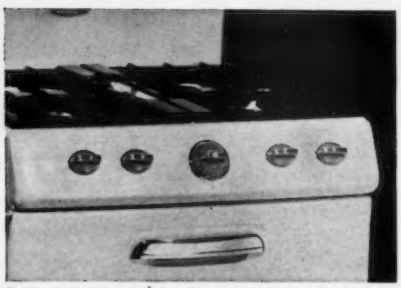
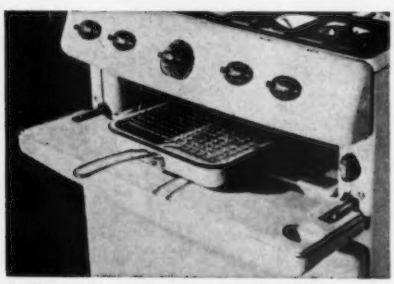
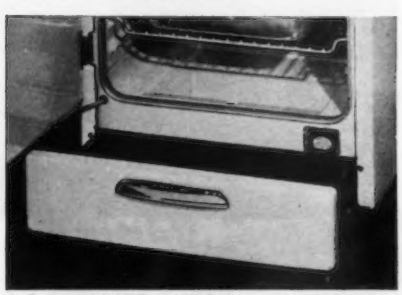


2. Entirely new 'glide-over' hot-plate design gives safe, non-spill support for even the smallest milk saucepans. Streamlined press-turn safety taps, with special LOW burning position, available in a choice of six colours, at no extra cost.



3. The grill is extra-large, and the grilling compartment has the new light-reflecting 'Ice-Blue' interior finish. The fall-door has been specially styled to give a smooth, absolutely level working surface when in the 'down' position.



4. Patented BAKE or WARM oven control; set to 'Warm', oven temperature stays well below 200° F ... *food cannot dry up.* Outsize 'Ice-Blue' oven takes 25 lb. bird easily; oven door, with stay-cool 'Plasti-chrome' handle, has studs for Flavel 'Handyrack'.

From a Paper presented to the East of Scotland Junior Gas Association on October 6.

Should the Industry Remain Independent?

By J. D. CAMPBELL, A.M.Inst.Gas E.,

GRANGEMOUTH UNDERTAKING, SCOTTISH GAS BOARD

THE path that lies ahead of the gas industry is obscure. The doubtful availability and the cost of coal, and the unrealistic price at which coke sells, discourage any extension of the carbonising process. In view of the conflicting factors of the anticipated need for coke as a result of the national desire for clean air and the unlikelihood of a favourable coal/coke price ratio, the capital invested in carbonising plant in the future will be sufficient only to meet the demand for coke. The chemical value of our other by-products may also affect the scale upon which coal is carbonised. The alternatives—the use of oil, complete gasification, any natural gas found, liquid butane and imported liquid methane—will provide, in as yet unknown proportions, the means of meeting increased demand for gas. One striking development is the increasing use of oil. Since June three gas boards in the South of England have announced plans to reform refinery gas to produce a total of approximately 66 mill. cu.ft. per day. And some 19 oil gasification plants are installed or are on order to produce a total of 47.5 mill. cu.ft. per day. Dr. Burns and Mr. Clark in their paper on imported liquid methane visualise a revolutionary scheme and indicate the changing background to the profession of gas engineering. However, the disadvantages of importing basic materials, whether oil or liquid gas, make the problem complex and take it into the sphere of international politics. One problem in particular repeatedly rears its ugly head: The position of coke in our industry. An aspect of this subject which has never been mentioned, so far as I know, is the fact that the Herbert Committee is of the opinion that the electricity industry should not embark on any course for the main purpose of benefiting the national interest (this being the business of the Government) but should heed only its own economic considerations. This seems logical to me, if we must have competition in the fuel industries. The coal industry places its own considerations before the national interest and the railways do not think twice about closing down a branch line which is uneconomic. If the gas industry were to adopt such a determined policy (if we regard clean air as being in the national interest) then we need not feel obliged to produce the coke to meet any future increased demand, if the production of that coke is not economic. I see no reason why the gas industry should not pursue the course of independence, albeit that this would aggravate the free-for-all which flourishes in the absence of a national fuel policy.

Although a diminishing production of coke would provide a wider market for gas, it is unlikely that we would capture the whole of this market as many consumers would undoubtedly choose one of the alternatives. Should the Minister direct that sufficient coke be made available, it is to be hoped that the price realised for this coke would balance the increased cost of making the coal gas produced. In any case, the prospect before us, if we look far ahead, is that we are gradually becoming more or less a one-fuel industry.

Keeping Down Costs

The result of the incessant search for means of keeping down costs is that the industry, in keeping with current fashion, is in fact employing a form of automation in concentrating manufacture in bigger works and modern types of plant. While this increase in productivity is undoubtedly essential for the growth of the industry and for the benefit of those who work in it (as for all industries), it does mean a certain amount of deployment of personnel of all grades. The opportunity for advancement for the technically qualified young man still exists, if not more so than before, but he must be prepared to make certain adjustments.

If we wish to offer gas at a competitive price we must constantly strive to keep costs at the lowest possible level and it is indeed encouraging to see so much effort being directed towards this end. The various new plants for producing gas from alternative sources and the numerous schemes of integration indicate that engineers are aware of the urgency of the situation. In our own area we have a comprehensive scheme whereby standards of manufacturing costs and efficiencies are set and maintained. But there is another way of keeping down costs: Selling more gas, a matter which, I declare, has been left mainly to chance. While cheaper gas brings increased sales, increased sales cheapen the cost of gas. I would add, however, that cheaper gas does not sell itself automatically. In the last five years, most of the extra gas sold has been to industrial loads, probably because the domestic and commercial markets, with their lower consumption per consumer, have been regarded as reasonably safe and not worthy of the same attention. Those who have had expanding industrial loads may find that prosperity in this field will not continue at the same tempo in the future. Because of this, and because of the fact that we are not so secure in some branches of the domestic market where we once had a firm hold, we must start looking towards the domestic consumer for increased sales, and taking definite steps to secure them.

Advertising is good, but alone can never be the complete answer. If the public were really aware of the benefits of gas there would be at least a gas poker and a sink water heater in every home. What we need is salesmanship, with salesmen who are offered an incentive to sell. I do not mean showroom attendants, who do a good job at present, but cannot possibly do more than wait for the customer to call at the showroom and who spend most of their time carrying out the routine job of receiving money and complaints. While keen salesmen and private traders are liable to sell unsuitable appliances and to 'talk' a customer into buying, the gas industry would do well to take the risk.

Price of Appliances

There appear to be two schools of thought on the price of appliances. There is the opinion that the cooking load which we have enjoyed for so many years can be directly attributed to the cheap hire and free loan cookers which, subsidised by the sale of gas, were brought within the reach of everyone in the early part of this century. Mr. Ford referred to this last year when addressing the Scottish Association of Gas Managers but admitted that such an extreme course of action was not possible today. The fear that a new appliance will consume less gas than the old one which it replaces is outweighed by the fact that the purchaser has invested in an article which must last for a long time and has consequently committed herself to use gas in the years ahead. Would not a smaller revenue from appliance sales be a good long-term investment for the industry? Only if it resulted in increased appliance sales, and it is here that we come to the other point of view, that it is the price of gas which is important.

A year ago Mr. F. G. Cox of the Eastern Gas Board, estimated that if every domestic consumer in that area were induced to buy a gas poker, the increase in domestic gas sales for his Board would be 6% and in total sales 3.7%. And by giving away pokers, charging for their fitting at cost price, the ultimate profit to the Board from gas sales would be over £90,000 per year.

The means whereby consumption per consumer can be increased in the domestic field has been the subject of much thought for many years and the use of promotional tariffs has been advocated by many eminent gas engineers. While much has been said in the past to commend these methods, it is encouraging to note that opinions recently expressed indicate an awakening interest in the subject.

London Flexibles Centre Opened

COMPANY ADDS NEW JOURNAL TO ITS ADVISORY SERVICE

THE new and enlarged London Flexibles Centre operated by the flexibles advisory service of the Compoflex Co., Ltd., was officially opened by Sir Norman Kipping, Director-General of the Federation of British Industries, on October 25. During the opening ceremony Sir Norman announced publication of the first issue of *Arteries of Industry*, a quarterly journal which the company are introducing as part of their advisory service.

The new journal is to be distributed each quarter to users and potential users of flexible tubes and hoses, and will contain technical and general interest articles written by outside contributors on the importance of flexibles to their own particular industries.

Inadequate Facilities

The London Flexibles Centre was originally opened in 1952 at Grosvenor Gardens as the first step in the formation of a comprehensive flexibles advisory service, but the increasing use made of the service by industry, both at home and abroad, soon made the facilities inadequate. To relieve pressure on the London Centre, a Northern Flexibles Centre was opened at the company's Oldham factory in 1954, to cope with enquiries from industry in the Midlands and the North. Earlier this year it was obvious that the London premises were still not large enough, and new showrooms and offices were found in Northumberland Avenue to house both the increasing head office sales and administrative staff and the advisory experts.

The comprehensive exhibition of flexibles displayed in the Centre follows the same broad divisions as the sales and advisory groups so that customers can assess more readily the various types available for particular operations. The exhibition is arranged so that each advisory group faces its relevant flexibles display to facilitate reference.

If a problem or enquiry cannot be answered without actual experiment or research, it is automatically passed to technical laboratories at the company's design and development establishment at Godalming, Surrey.

Seen at the opening of the Centre (left to right) are Mr. S. Polkinghorn, General Commercial Manager; Mr. J. V. Klein, Joint Managing Director; Sir Ian Horobin, M.A., M.P. for Oldham East—the Compoflex factory is in his constituency—and Sir Norman Kipping, Director-General of the Federation of British Industries.

From Shivery Castles to Comfortable Homes

'BUILDING FOR WARMTH' SHOWS THE WAY

'THIS booklet tells you how to make the homes of tomorrow much warmer than the shivery castles of yesterday without using any more fuel,' said Mr. David Renton, Parliamentary Secretary, Ministry of Fuel and Power, when he introduced a new publication, 'Building for Warmth,' issued by the Domestic Insulation Committee at the Building Centre on October 30.

The booklet was a sequel to the publication in 1953 of the Committee's first booklet, 'Make Your House Cosier in Winter,' the purpose of which had been to help people living in the 12 mill. existing houses to make themselves more comfortable. The second booklet, 'let lose today on an expectant building industry,' was welcome, said Mr. Renton.

A house was a leaky affair as far as heat was concerned and the book told how to build a house in such a way that it imprisoned the heat produced by a fire. It told us how to insulate walls, floors, roofs, windows, and doors.

Discussing what are called U values, it helped us over the difficulty by reaching the conclusion that so far as heating was concerned the more non-U the better, he added. It was a most valuable pamphlet, carefully prepared by experts.

Mr. F. R. Yerbury, O.B.E., Director of the Building Centre Council, thanked Mr. Renton for coming along to launch the booklet.

Sir Alfred Hurst, K.B.E., C.B., welcomed Mr. Renton and the Press to the Building Centre.

'Building for Warmth' was prepared and issued jointly by the Gas Council, the Coal Utilisation Council, and the British Electrical Development Association, the members of the Domestic Insulation Committee.

Incentive Scheme Introduced in Scotland

AN incentive scheme is being introduced for gas staffs in Scotland —but not for sales employees. This was announced recently by Mr. Sidney Smith, Chairman of the Scottish Gas Board, at a meeting of the West of Scotland Sales Circle in Glasgow.

The Board had decided to introduce a 'prospect card' scheme, for all employees other than sales staff, said Mr. Smith. The scheme provided for cash rewards for business introduced, provided a sale was made. The prospects would be passed to the sales and service staff for attention.

The success of the scheme would depend on everyone co-operating to the fullest extent. There was no reason why it should not be an unqualified success.

Sales Staff Excluded

Asked about the exclusion of the sales staff, Mr. Smith said the first point to be considered in looking into a bonus scheme for sales staff was the question of targets. Because of hire-purchase restrictions sales of cookers were down by 30% to 40%. It was not possible in these conditions to fix targets; a level market was needed to do so. If and when this inflationary spiral eased down and a stable economy returned to the country, a bonus scheme for sales staff might be considered.

Beyond a comment on the modern tendency of the country to want a 'carrot' for doing a particular job, Mr. Smith declined to discuss the matter further.

Manchester Section Visit W. C. Holmes & Co.

GENERAL MEETING IN HUDDERSFIELD

MEMBERS of the Manchester and District Section of the Institution of Gas Engineers were entertained to luncheon by W. C. Holmes & Co., Ltd., when they held their ordinary general meeting in Huddersfield recently. Before lunch the party were shown over the Company's works.

Among exhibits which the visitors saw was a Preston bubble hood tray used for a benzole still 7 ft. in diameter, with 12 trays, each fitted with 64 bubble hoods, to treat 1,600 gal. of oil per hour. A stress relieving oven, capable of temperatures up to 650°C. was also exhibited. A large part of the work done with this oven is with the object of avoiding stress corrosion cracking of welded steel vessels handling unpurified coal gas and coke oven gas.

Holmes-Western '55 Type' valves were also seen, as well as a Trion electronic air filter capable of collecting even sub-microscopic airborne particles.

Another piece of equipment of similar application was a Schneible multi-wash collector designed to handle 500 to 600 cu.ft. per minute of dust laden air.

Seen during the visit to the works of W. C. Holmes and Co., Ltd., are (left to right) Mr. W. S. Hubbard, Production Engineer, Liverpool Group, North Western Gas Board; Mr. H. Whitely, Director, W. C. Holmes and Co., Ltd.; Mr. J. M. McLusky, Chairman, Group General Manager, Wakefield Group, North Eastern Gas Board; Mr. N. G. Appleyard, Group General Manager, Leeds Group, North Eastern Gas Board; and Mr. J. G. Tilley, Group General Manager, Huddersfield-Halifax Group, North Eastern Gas Board.

Of particular interest was an inert gas generator comprising a completely new application of inert gas plant for fire-fighting on board ships at sea.

This unit, which is to be installed on board m.v. Igori, at present being built in Glasgow, produces inert gas containing less than 1% oxygen, less than 1% carbon monoxide, approximately 14% carbon dioxide, and 85% nitrogen.

A No. 50 B.M. meter was shown with the drum installed, but the top plate removed so that the motion of the drum could be seen; as well as a Holmes-Connersville booster, and two multifilm washers. The first of these washers, size 14 by 4, is to handle gas from an Onia-Gegi installation in Hastings, New Zealand, and is of capacity 600,000 cu. ft. per day; while the second is a naphthalene washer for Wellington, New Zealand, of capacity 6.5 mill. cu.ft. per day.

After lunch, which was at the George Hotel, Mr. Brian Holmes, Chairman and Managing Director, W. C. Holmes & Co., Ltd., welcomed the Section and in particular Mr. G. E. Currier, Col. W. M. Carr, Mr. L. Hartley, of Clayton Son & Co., Ltd.; and thanked Mr. A. H. Nicholson and Mr. Hudson for all the work they had done on the arrangements.

Mr. J. M. McLusky, Chairman of the Section, thanked Mr. Holmes for the hospitality. He said it was a very good attendance for which great trouble had been taken.

At the meeting which followed lunch, Mr. McLusky welcomed Mr. G. E. Currier and Mr. A. M. McDonald and eight past Presidents and Chairmen.

Presentation of certificates to successful students resident within the area of the Manchester and District Section were then made, the certificate of the Associate Membership Examination Gas Engineering (Manufacture) going to D. Barber, Thurnscoe, Nr. Rotherham; K. Chadwick, Preston; and R. Skilbeck, Mirfield; while the certificate of the Associate Membership Examination Gas Engineering (Supply) was handed to M. G. Barnes, Harrogate; and F. S. Howard, Greasby, Wirral. The Higher Grade Certificate in Gas Engineering (Supply), second class, went to W. Andrews, Liverpool, and B. Wilson, Birkenhead.

SOCIETY FOR ANALYTICAL CHEMISTRY

THE twelfth annual general meeting of the physical methods group of the Society for Analytical Chemistry will be held on November 28, at Burlington House, Piccadilly, London, W.1. The business meeting will be followed by the 56th ordinary meeting of the group, at which the lecture, 'Optical Rotations in the Study of Organic Structures,' will be presented by Dr. W. Klyne.

Joint Meeting

A joint meeting of the physical methods group, and the North of England Section of the Society was held in Manchester on October 19, when the following papers were presented and discussed: 'Ion Exchange in the Study of Complexes,' by T. V. Arden; and 'Some Recent Applications of Ion Exchange in Biochemistry,' by T. S. Work.

Another joint meeting was of the Scottish section of the Society with the Stirlingshire sections of the Royal Institute of Chemistry and the Society of Chemical Industry held at Falkirk. The meeting took the form of an exhibition and demonstration of modern analytical apparatus including a 'Statistical' calculating machine, an 'Electronik' continuous balance potentiometer, an interference microscope, and a proximity meter.

N.G.B. Approves New Coke Handling Plant

FOLLOWING a steady increase in the demand for graded coke for domestic purposes, the Northern Gas Board has approved the installation of a new coke handling plant at the Hendon works, Sunderland, it is reported.

Capacity of the plant will be 15 tons per hour with bunker storage of 150 tons. Erection of the plant will begin early in 1957 and should be available to meet increased demand during the winter of 1957-58.

Steady progress is reported in the laying of a 16 in. diameter high pressure main from Ryhope Village to the Hendon works. Of a total of 3,250 yards, 1,950 yards have so far been laid.

This main is an extension to the existing main operating betwen Tees-side and Sunderland Divisions and will enable the transfer of additional bulk supplies as required in either direction.

It has been designed to handle the total output of gas from the new Murton coke ovens—some 7 mill. cu.ft. of purified gas a day.

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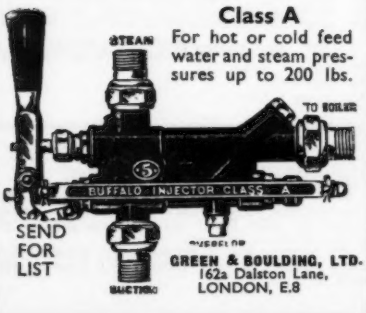

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APPOINTMENTS VACANT

SOUTHERN GAS BOARD

PUBLICITY MANAGER

APPLICATIONS are invited from suitably qualified persons for the above appointment at Area Headquarters, Southampton.

The starting salary for this post will be between Grades 'E' and 'F' (£1,525 or £1,925) of the National Salary Scales for Senior Gas Officers, or by arrangement with the successful candidate according to qualifications and experience.

The person appointed will be responsible for public relations and advising the Board on all aspects of publicity throughout the Board's area.

The successful candidate will be required to pass a medical examination and, unless already subject to a Pension Scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required to join the Board's Staff Pension Scheme.

All applications must be made on a form which may be obtained from the Personnel Manager, Southern Gas Board, 164, Above Bar, Southampton, and completed forms should be returned by November 30, 1956.

WALES GAS BOARD

INDUSTRIAL GAS ENGINEERS
NORTH AND SOUTH WALES

APPLICATIONS are invited for two ASSISTANT INDUSTRIAL GAS ENGINEERS, within the salary range of A.P.T. 10 (Provincial "A" £820/£920 per annum) of the National Salary Scales for Gas Staffs.

Applicants should have experience in the design, construction and installation of industrial and commercial equipment, and should have passed the associate membership examination of the Institution of Gas Engineers, or possess an equivalent qualification. The position is pensionable.

The successful applicants will be required to pass a medical examination.

Applications, stating age, educational qualifications and experience, together with the names of two referees, should be addressed to the undersigned not later than November 19, 1956.

C. B. MAWER,
Secretary to the Board.

2, Windsor Place,
Cardiff.

SCOTTISH GAS BOARD

FIFE GROUP
HOME SERVICE ADVISER

APPLICATIONS are invited for the above position. Candidates should have at least two years training in Domestic Science and/or Household Management and hold the appropriate Diploma.

The establishment will be A.P.T. 4 Provincial 'A,' the salary scale for which is £323-£490 per annum with placing according to experience.

The appointment will be superannuated and the successful candidate will be required to pass a medical examination.

Applications, in own handwriting, giving full details of experience, etc., should be addressed to the undersigned not later than November 20, 1956.

DAVID L. DICKSON,
Group Manager.

Gas Offices,
Grange Road,
Dunfermline.

October 29, 1956.

SCOTTISH GAS BOARD

WESTERN GROUP
GREENOCK, GOUROCK, PORT GLASGOW & SKELMORLIE DISTRICT
TECHNICAL ASSISTANT

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT at Greenock. The salary will be within Grade A.P.T. VI (£610—£690 per annum) of the National Joint Council for Gas Staffs, Provincial A Scale, with placing according to qualifications and experience.

Candidates should have had experience in working of carbonising and ancillary plant.

The position is pensionable and the successful applicant will be required to pass a medical examination.

Applications stating age, and giving particulars of education, training, experience and qualifications should be addressed to the undersigned to arrive within 14 days from publication of this advertisement.

WILLIAM KIRK,
District Manager.

Inchgreen Gas Works,
Greenock.

October 29, 1956

CHEMICAL ENGINEER required, with experience in design and operation of plant for the production of hydrogen from solid, liquid and gaseous fuels. Please send full details in writing to: L. H. Manderstam & Partners, 38, Grosvenor Gardens, London, S.W.1.

THE METAL BOX COMPANY, LTD., The Technical Engineering Division require the services of a SENIOR ENGINEER to take part in supervision of their Field Erections in this country and overseas, dealing with Conveyor Ovens and Industrial Heating Processes generally. The successful candidate will need experience in this particular field and in overall supervision of outside work. The post which is one of considerable responsibility will be well paid. Applications with full information should be addressed to the Personnel Officer, Technical Engineering Division, The Metal Box Co., Ltd., Chandos Road, N.W.10.

NORTH EASTERN GAS BOARD

YORK-HARROGATE GROUP
TECHNICAL ASSISTANT (GROUP)

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT at Group Office, Harrogate, at a salary within Grade A.P.T. 7 (Provincial 'A') (£670-£750 per annum) of the Salary Scales agreed by the National Joint Council for Gas Staffs.

Applicants should possess the Higher National Certificate in Civil Engineering (Gas Engineering) or equivalent qualification, and should have a wide experience in the control of manufacturing plant, including Horizontal and Vertical Carbonising Plants and C.W.G. Plants. The duties will include assistance in the control of a number of the smaller works in the Group. Experience in the control of labour and the preparation of working drawings is necessary.

The successful applicant will be required to pass a medical examination and to join the Board's Staff Pension Scheme.

Applications stating age, experience, training and qualifications, should reach the Group General Manager, North Eastern Gas Board, York-Harrogate Group, 48, James Street, Harrogate, by November 19, 1956.

J. C. GARDNER,
Secretary.

NORTH WESTERN GAS BOARD

NORTHERN GROUP
WORKS FOREMAN—WINDERMERE

APPLICATIONS are invited for the above pensionable position at Windermere (annual make 88 mill. cu.ft.). The salary will be within Grade A.P.T. 6 (£610/£690 p.a.).

Applicants should have experience of the operation of vertical retorts and ancillary plant, the maintenance of steam and electrical plant and the control of labour. The plant is in good condition and there are good prospects within the Group for the right man.

The successful applicant will be required to live in a house provided adjacent to the works and take complete control of the works in the absence of the Station Engineer.

Detailed applications, giving the names of two referees, should reach the General Manager, N.W.G.B., Northern Group, St. George's Quay, Lancaster, within 14 days.

NORTHERN GAS BOARD

TEES-SIDE DIVISION

APPLICATIONS are invited for two TECHNICAL ASSISTANTS at the Stockton Unit:—

(1) Salary within A.P.T. Grade 8 (£710-£790 per annum) of the National Salary Scales for Gas Staffs. Candidates should be familiar with the operation of both Horizontal and Continuous Vertical Retort Plants. Experience in the Mechanical and Electrical Maintenance will be an advantage.

(2) Salary within Grade A.P.T. 5 (£575-£655 per annum) of the National Salary Scales. The candidates appointed will be required to undertake general duties in the drawing office, laboratory and works.

Both posts are pensionable and the successful candidates will be required to pass a medical examination.

Applications, clearly indicating the post applied for and stating age, experience, qualifications and the names of two referees, should be received by the undersigned not later than November 30, 1956.

JOHN W. PALISTER,
Divisional General Manager.

Commercial Street,
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20	Brooks	Screen Prot.	750
19	E.E.C.	Totally enc.	1460
18	Brooks	Totally enc.	1430
15	Brooks	Totally enc.	955
12	Crompton Parkinson	Screen Prot.	725
19	Brooks	Totally enc.	960
10	L.D.C.	Screen Prot.	720
10	E.E.C.	Screen Prot.	570/720
5	Metro-Vick	Totally enc.	2920
5	E.E.C.	Totally enc.	1460
4.5	Metro-Vick	F.L.P.	976
4	E.E.C.	Screen Prot.	1450
3	Brooks	Totally enc.	3000
3	Laurence Scott	Screen Prot.	2900

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PUBLIC NOTICE

ALKALI, &c., WORKS REGULATION ACT, 1906 as extended by S.17 of the CLEAN AIR ACT, 1956, PUBLIC HEALTH (SMOKE ABATEMENT) ACT, 1926.

NOTICE IS HEREBY GIVEN that the Minister of Housing and Local Government has under consideration the making of an order or orders under Section 4 of the Public Health (Smoke Abatement) Act, 1926, extending the list of works mentioned in the First Schedule to the Alkali, &c. Works Regulation Act, 1906, and, if necessary extending the list of noxious or offensive gases mentioned in Section 27 of that Act. In making any such order the Minister will have regard to the recommendations contained in paragraphs 43-45 and 99-101 of the report of the Committee on Air Pollution (Cmd. 9322). Any representations in this connexion which it is desired to make to the Minister should be made in writing and addressed to the Secretary, Ministry of Housing and Local Government, Whitehall, London, S.W.1, not later than the thirty-first day of December, 1956. Notice of the public inquiry which the Minister is required to hold before making an order will be given at a later date.

S. G. G. WILKINSON,
Assistant Secretary,
Ministry of Housing and Local Government.

October 29, 1956.

T.23.10.3/56/50.

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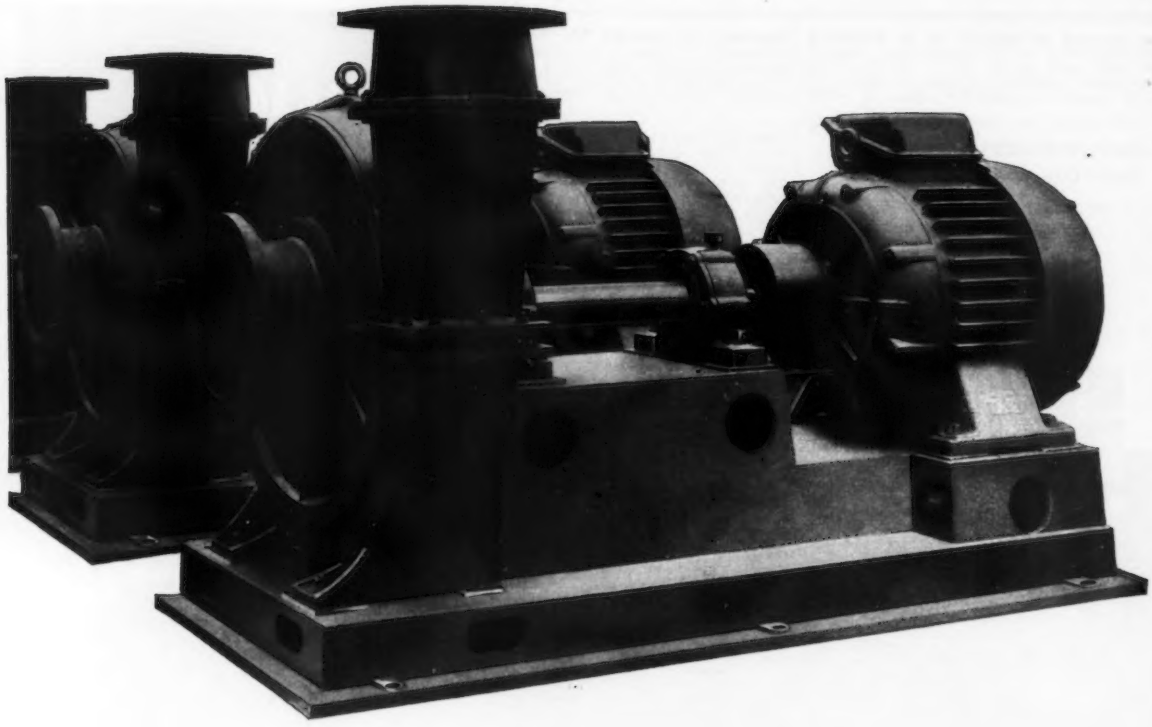

Gas Boosters?

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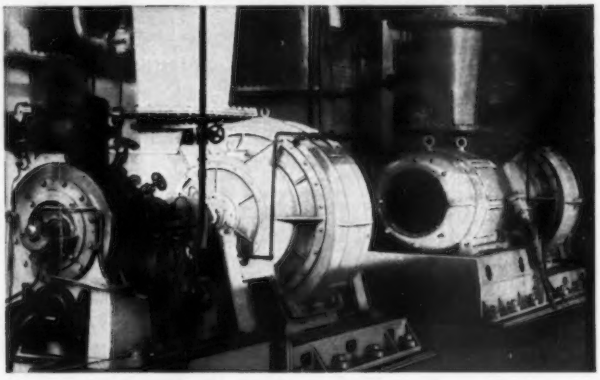

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